The IRON AGE
June 5, 1958
A Chilton Publication
The National Metalworking Weekly

New Process Broaches Gears In One Pass P. 117

Workers Pitch In To Lick Recession – P. 77

How Conveyors Fare In Plant Spending Dip – P. 172

Digest of the Week P. 2-3

CASE HISTORY NO. 1

Production Boosted 44% on this Bushing

A switch from 52100 to 52100 *Leaded* permitted spindle speeds to be increased from 234 to 351 R.P.M. Machine speed was upped from 65 to 90 S.F.M. and feed from .004 to .006 I.P.R. Production rose from 89 to 130 pieces per hour.

Selecting the right steel for the job is basic VALUE ANALYSIS

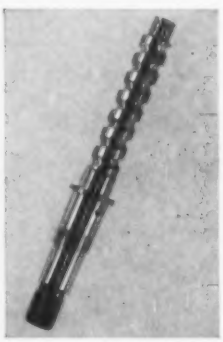
In each of these products an Aristoloy Steel helped a company trim costs. They are typical of hundreds of cases where a Copperweld electric furnace steel has solved a problem or suited a customer's particular requirements. For on-the-spot assistance on your metalworking problems, a Copperweld Field Metallurgist will be happy to work with you. Just call our nearest district office or write today.

CASE HISTORY NO. 2

Pinion Hot-Formed from Special Conditioned Steel

Electric furnace steels satisfied this customer's demand for cleanliness and uniformity. Special conditioning and processing before re-rolling developed the exceptional forging qualities required.

CASE HISTORY NO. 3



Steering Worm Cost Cut by Extruding & Upsetting

This part was cold extruded and upset from a $\frac{29}{32}$" Aristoloy round to a finished maximum diameter of 1.440". Special processing produced a steel that met these requirements, and resulted in substantial savings in material and machining time.

CASE HISTORY NO. 4

Tool Life Soared from 25 to 750 Pieces on Counterboring Operation

On a 2.17" I.D. counterboring operation in this forging, a change from A.I.S.I. to A.I.S.I. *Leaded* produced a better chip formation, eliminated fouling of the tool and resulted in a remarkable improvement in tool life.

NEW CATALOG
on Leaded Steels

We will be happy to send you complete information on Aristoloy carbon, alloy, and stainless steels. Mail coupon today.

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Title_____

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Bethlehem Flanged-and-Dished Heads are easy to weld because they are made from grades of steel of uniformly high quality.

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Bethlehem also produces standard manhole and handhole saddles, covers and fittings. We also furnish heads with flued openings. To help you maintain production schedules, Bethlehem stocks a number of flanged-and-dished heads for prompt delivery. Write to the nearest sales office for our stock list, or for full information on Bethlehem heads to meet your requirements.

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The IRON AGE

June 5, 1958—Vol. 181, No. 23

Digest of the Week in

*Starred items are digested at right.

EDITORIAL
Our French Lesson: Will We Learn From It? ... 7

NEWS OF INDUSTRY
*Special Report: How Workers Help Management to Get New Business ... 77
Atomic Fuel: Filter-Tip Size ... 79
*More Aluminum for Packaging ... 80
USS to Make Aluminized Sheet ... 81
*Steel Expansion in for Breather ... 82
*Some Tax Cuts Are Still Possible ... 83
*Fleet Leasing Gains Momentum ... 84
Construction Gains ... 85
*Ore Project Advances ... 86
The IRON AGE Salutes ... 91
Men in Metalworking ... 107

FEATURE ARTICLES
*New Broaching Tool Cuts Helical Gears in One Pass ... 117
*Inserts Simplify Rotor Casting ... 120
*Measuring Shot Peening Effects ... 121
*Higher Density for Powder Metal ... 124
*Special Tools Machine Gear Parts ... 126
Flying Press Speeds Short Runs ... 129
*Resistance Seam Welding Speeds Up ... 130
Submerged Arc Does Fast Rebuild ... 132

NEWS ANALYSIS
Newsfront ... 75
Report to Management ... 93
Automotive ... 94
*Washington ... 99
West Coast ... 101
*Machine Tool ... 103

MARKETS & PRICES
*The IRON AGE Summary ... 171
*Purchasing ... 172
Steel Product Markets ... 174
Index to Prices ... 175
Nonferrous Markets ... 178
Clearing House ... 188

REGULAR DEPARTMENTS
Fatigue Cracks ... 11
Technical Briefs ... 147
Materials Roundup ... 158

INDEX TO ADVERTISERS ... 194

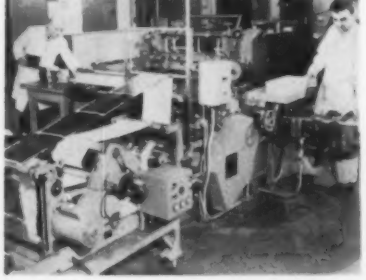
NEWS ARTICLES

LABOR RELATIONS

Help Fight Recession—Workers are helping management compete for scarce business by cutting costs and improving efficiency. Cross section of metalworking shows how many plants are gaining worker help. Unions cooperate. P. 77

PACKAGING

More Aluminum Used—The aluminum industry is happy with its gains in packaging use. But they



see vast new uses still ahead and are going after them. P. 80

TAX LEGISLATION

Cuts Still Possible—In spite of closing the door on major tax cuts, some may get through congress. Best possibilities are some excise tax cuts and a small business bill providing for moderate relief. P. 83

FLEET LEASING

Popularity Grows—In the past 10 years the number of leased ve-

Metalworking

▼

SPEEDS BROACHING: Officials of National Broach & Machine Co. look over new broaching tool. Left to right they are: F. I. Kirsten, General Superintendent, B. F. Bregi, Vice President Engineering, and W. S. Praeg, President. P. 117

hicles has grown 500 pct. Private business learns that leasing frees capital for other uses, and is cheaper than paying mileage. P. 84

GOVERNMENT CONTROLS

More Ahead—Defense Secretary warns that demands of the climbing defense budget will mean more rigid controls on business. Most restrictions of Korean War are still on the books. P. 99

FEATURE ARTICLES

ROTOR CASTING

Simplify with Inserts—A turbine manufacturer is combining wrought iron inserts into casting method to get one-piece rotor. Punched holes in insert key into casting. P. 120

SHOT PEENING

Test Measures Effects—Thanks to recent research, a troublesome blind spot may be transformed into a handy measure of control. A new non-destructive electromagnetic test determines the depth of layer of metal compressed by shot peening and also measures shot-peening quality. P. 121

POWDER METAL PARTS

Call for Higher Density — As powder metallurgy progresses from simple parts of low density to more complex shapes of higher density, pressure and control factors become more critical. It has led to the design of large-tonnage presses with three or more individual punch motions to simplify tooling. P. 124

GEAR COMPONENTS

Use Special Tools—Close tolerances can transform easy jobs into difficult cases. One such workpiece is a planet gear ring for an automatic transmission. Special tools and setups are required to insure quality. P. 126

RESISTANCE WELDING

Fits into High-Speed Lines—Teamed with stamping and efficient handling in automated lines, resistance seam welding is cutting costs and improving quality at one installation producing rings and shells in volume. P. 130

MARKETS & PRICES

STEEL EXPANSION

Boom Has Lost Its Steam—The big post-war steel expansion boom has run out of steam. It looks like 1959 will be a breather year followed by four more years of low capital spending. P. 82

ORE PROJECT

Moves Ahead — U. S. Steel's Quebec project for ore concentrates moves ahead with bids for railroad construction. Plant for 8 million tons of concentrates a year will follow. P. 86

MACHINE TOOL BUYING

Tax Bite Hurts—NMTBA head warns that high taxes and depreciation laws hold back tool buying. Builders will have to develop products that users can't afford to pass up. P. 103

STEEL MARKET SURGE

Hedge Buying Grows—The steel market is showing signs of life. But much of it is due to hedging against an expected price boost. A July slump is probable. P. 171

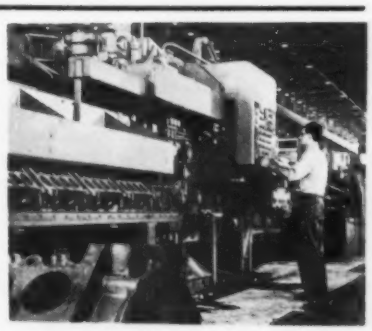
CONVEYOR SALES

Due for a Rebound—Despite the current slump conveyor manufacturers are optimistic. They believe users will move quickly to up-date materials handling equipment as soon as confidence in the business outlook returns. P. 172

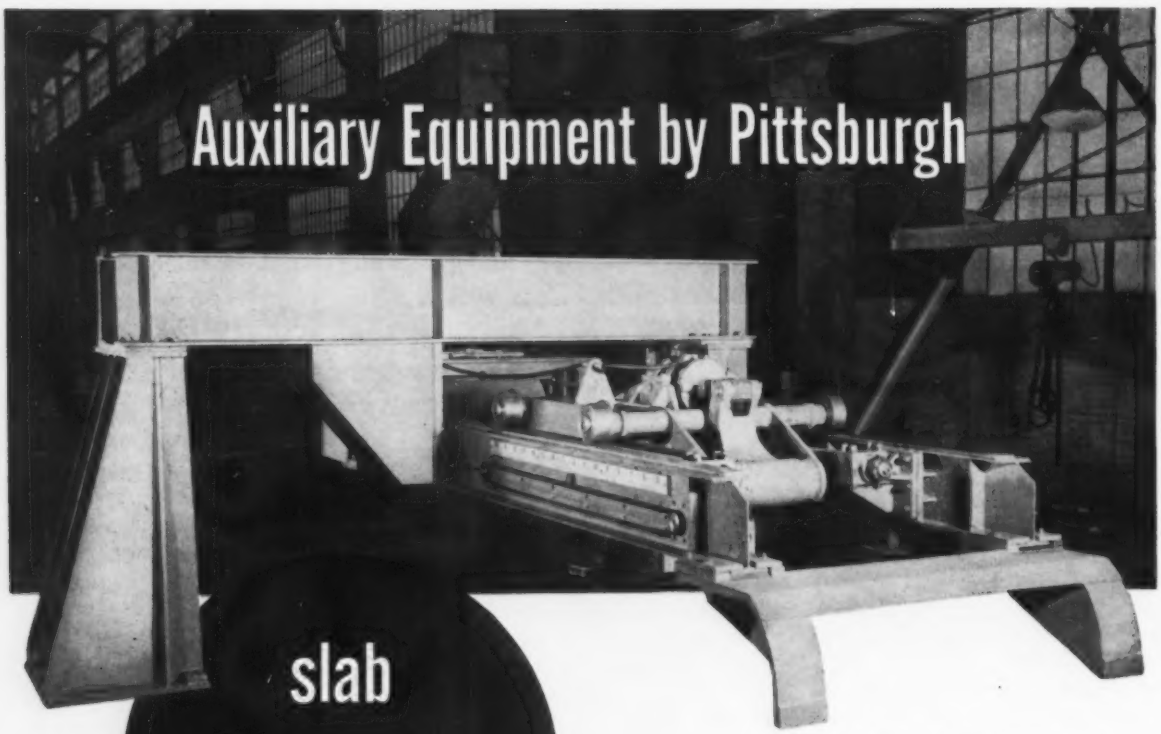
NEXT WEEK

LABOR AND AUTOMATION

Unions Face Tough Going—Will increased use of automation stunt union growth? This question will be considered in next week's special report. The toughest segment of the labor force to unionize—technicians and clerical workers—is growing.

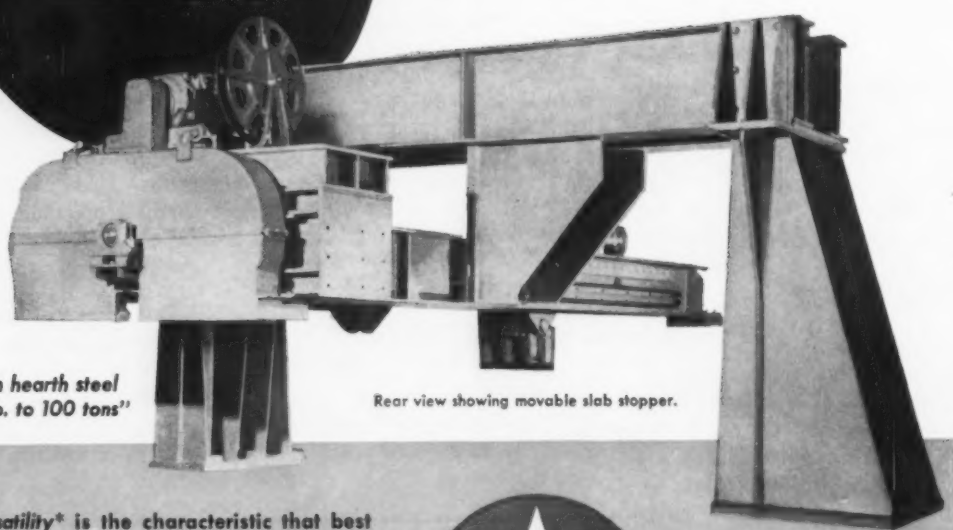


Auxiliary Equipment by Pittsburgh



Front end of gage for attachment to shear.

slab shear gage



Rear view showing movable slab stopper.

"Electric and open hearth steel castings from 1 lb. to 100 tons"

Versatility* is the characteristic that best describes the engineering and production departments of our Company.

This Slab Shear Gage is typical of the many items of auxiliary equipment successfully designed and produced by our plant for the metal working industry. Next time you need primary or auxiliary mill equipment, contact Pittsburgh.

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"esp. ability along many lines of effort."

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ALL edges and surface junctures of this aircraft component must be blended to microinch specifications to eliminate stress concentrations and ultimate fatigue cracks.

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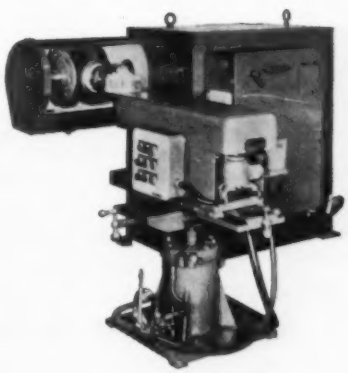
Using Osborn's Brushamatic® Machine, the operation that once took 15 minutes is now done in 3 minutes . . . a 400% *increase in output per man—and a saving of 180 hours a month.*

This kind of precision finishing can save money on many types of products you manufacture today. An **O**sborn **B**rushing **A**nalysis, made in your plant, will show you how. Write us for details—and for your copy of the 100-page Osborn Catalog 210-C . . . and for the 20-page Brushamatic® booklet. *The Osborn Manufacturing Company, Dept. F-70, Cleveland 14, Ohio.*



Brushamatic® 3-A

Osborn Brushes

BRUSHING MACHINES • BRUSHING METHODS • INDUSTRIAL BRUSHES • FOUNDRY PRODUCTION MACHINERY

Armco 17 Stainless Steel Sheets Now Cost 20% Less Than Type 302

In Many Applications, Type 430 delivers the most for the least

If you now use chromium-nickel stainless steels in products that don't come in contact with corrosive chemicals, sea water, or salt air, there's a chance that economical Armco 17 (Type 430) Stainless Steel can bring you substantial savings.

Today, for example, the price base of Armco 17 (17% chromium) Stainless Steel sheets is about 20 per cent less than that of Type 302. That's a saving of 11¼ cents a pound—$225 a ton! The reason is that Armco 17 contains no costly nickel.

Ideal for many products

If you have hesitated to specify chromium-nickel stainless steels for your products because of cost, it may pay you to investigate economical Armco 17.

Typical examples of products that can be improved with this low-cost stainless steel include architectural trim, appliance parts, tableware, counter tops, hospital equipment, sinks and drainboards. In addition, its resistance to heat scaling and strength at high temperatures have made it ideal for heat exchanger parts, combustion chambers, and similar items.

Mail the Coupon for Details

Armco 17 Stainless is readily available in both sheet and strip. Why not check to see if this economical stainless steel is suitable for *your* products? It is also supplied in bar, wire and billets—at lower cost too. Just fill in and mail the coupon for complete information. There's no obligation.

Other Armco Steels for top-quality products include:

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Enameling Iron
High Strength Steel
Long Ternes
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ARMCO STEEL CORPORATION, 2338 Curtis St., Middletown, Ohio

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TITLE_____

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Our French Lesson: Will We Learn From It?

The recent crises in France hold many a lesson for us—if we want to learn from them. Tom Paine, that defender of freedom who did so much for the American people without their knowledge —or gratitude—would be aghast were he alive today. He was honored by the French in his day.

No matter what we think of General De Gaulle, the French people made it possible for him to come to power. Their lassitude in the face of reality forced a choice between him or a Popular Communist front.

Our stake in France's plight is frightening. Our diplomats can't say much—if anything. It would be construed as a serious intervention in France's internal affairs.

Sooner or later we must take an official stand. Our supply lines, the areas from which we serve NATO, and our old time friendships are in France.

But while our government struggles with these problems, which could spell chaos for us and our allies, we should think deeply about what our French lesson is.

The apathy of the French majority and the unintelligent manner in which their representatives acted—or did not act—brought France to her present plight. Up to the last minute after the military clique in Algiers thumbed its nose at the Paris government, hardly anyone in France was alarmed—or interested.

When the real truth dawned upon many that the Fourth Republic was on its way down the drain, there was apprehension. It was too late. Reforms which serious and loyal Frenchmen wanted were due long, long ago.

It will be a miracle if France can offset her apathy and negligence. The suspicion with which General De Gaulle is looked upon in some quarters has some basis in fact. It is quite speculative to think that France can throw off a brand of nationalism which threatens the hard work her leaders have contributed to the European Economic Community, The European Coal and Steel Community, and NATO.

The real lesson is that no nation can escape chaos when many of its people act like the ancient Romans, care little about their country's future, sell off principles for expediency, and shun their collective responsibility for free government based on honesty and integrity.

Will we learn this lesson in time before we too have our own crisis?

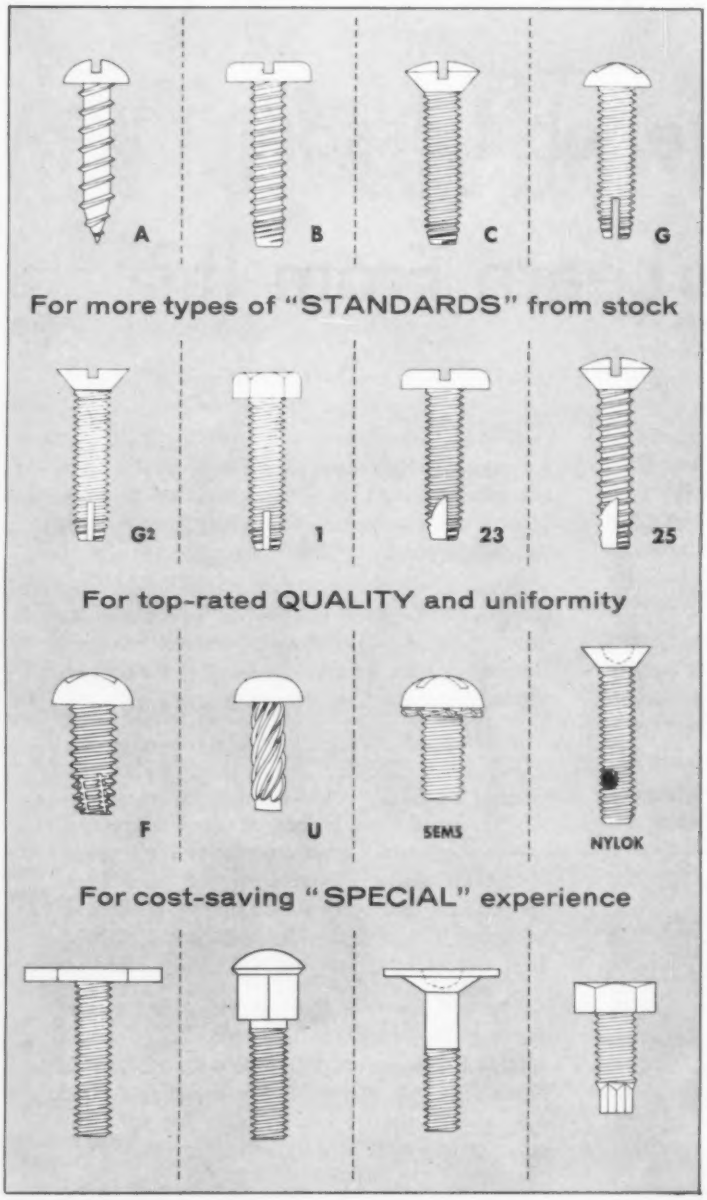
Tom Campbell

Editor-in-Chief

Count on *Continental* to show you why

you can measure the difference in assembly dollars

when you use the right type for the job



Which fasteners will serve best and save most in your assemblies? Many types of screws look much alike, but the difference between the right and wrong choice for your job can often make a big difference in assembly costs.

Since Continental makes and supplies *all* types, their recommendations are unbiased. They can tell you if you should be using some "standard" you have overlooked. Or, if a "special" will save you most, you can rely on Continental's specialized experience to design and produce it at the lowest possible cost.

CHECK YOUR ASSEMBLIES

Find out where Continental's cost-saving ideas can cut your assembly costs. Talk to a Continental Assembly Specialist. For prompt service, write or phone: Continental Screw Co., 450 Mt. Pleasant St., New Bedford, Mass.

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HOLTITE PHILLIPS AND SLOTTED HEAD
WOOD • MACHINE • TAPPING • THREAD CUTTING • SEMS • NYLOK
HY-PRO PHILLIPS INSERT BITS AND HOLDERS

LETTERS FROM READERS

"Keep It Coming"!

Sir—I have been reading Mr. Campbell's editorials for many months, and each time I do I wish there were some way these important messages could reach every citizen in this great land of ours.

He says more on one page than many authors do in an entire volume, and more than many politicians in a dozen speeches. If only there were means to make available these excellent editorials to more people. Keep up the good work, Mr. Campbell. I appreciate it, and I'm sure countless others do too.—R. E. Samuelson, Dir. of Purchases, Autopoint Co., Div. of Cory Corp., Chicago.

Plastics Machining

Sir—In the May 1 issue of The IRON AGE there was a feature article entitled "How to Machine Laminated Plastics." I would like to have a reprint of that article.

As the article indicates, these materials are coming into machine shops more and more all the time, and in our particular case this article is most timely.

Thanks for the very fine service you make available to your subscribers.—V. J. Liberty, Asst. Mgr., Rodney Hunt Machine Co., Orange, Mass.

Corrosion and Aging

Sir — In The IRON AGE for Mar. 20, p. 55, there appear two items of interest. They are headed "Clad Against Corrosion," and "Aging Process at Hand." Can you tell me more about them or refer me to the sources involved?—L. R. Westbrook, Solon, O.

▪ Contact Lukens Steel Corp., Coatesville, Pa. for information on corrosion item; E. R. Morgan, J&L Steel Corp., Fisher Bldg., Detroit 2, Mich. for information on aging process.—Ed.

Scratch Measurement

Sir—On p. 63 of the Mar. 27 issue of The IRON AGE you mention in your Newsfront item: "Measures Scratch Depth" about a portable instrument that has been developed to measure the scratches and pits on metallic surfaces. I am most interested in finding out more about this instrument.—M. Sabanas, Design Engr., Armour Research Foundation of Illinois Institute of Technology, Technology Center, Chicago.

▪ Contact the News Bureau, Boeing Airplane Co., Seattle 24, Washington.—Ed.

Plastic Nails

Sir — The items "Plastic Nails" and "Pigment for Metal Finish" noted in The IRON AGE Newsfront for Apr. 10 are of interest to us. Can you give us the names of the manufacturers involved so that we may obtain further data concerning these products?—J. W. Hunter, Vice Pres., Sherron Metallic Corp., Brooklyn.

▪ Contact the General Electric Co., One River Rd., Schenectady 5, N. Y.

"Well, we're through the winter slowdown, the spring slump, and we're looking ahead to the usual summer drop-off."

Tensile anyone?

Somers

is game

If tensile strength of thin strip is a critical requirement of your present or anticipated production, Somers Brass will be glad to serve.

Nearly 50 years of experience with thin gauge brass, nickel, copper and alloys, plus complete laboratory facilities are available, without cost or obligation to you, to solve your problems in tensile strength, dimensions, temper and other properties.

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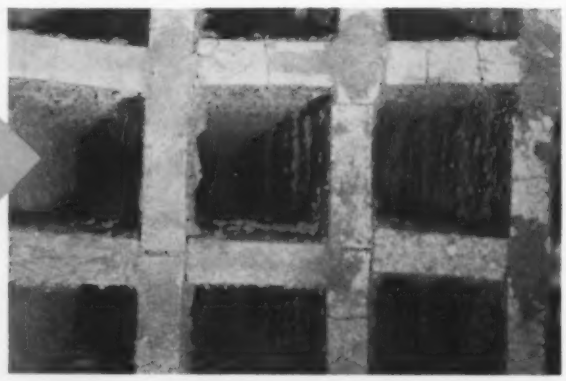
HARBISON-WALKER

FORSTERITE L CHECKERS

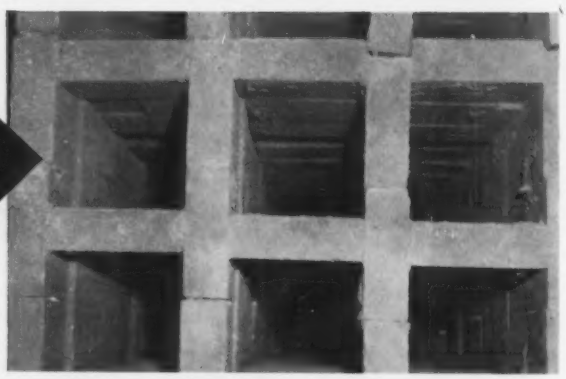
LIKE NEW AFTER 1105 HEATS!

AFTER THE FIRST TWO CAMPAIGNS—378 HEATS the Forsterite L Open Hearth checkers looked like this—



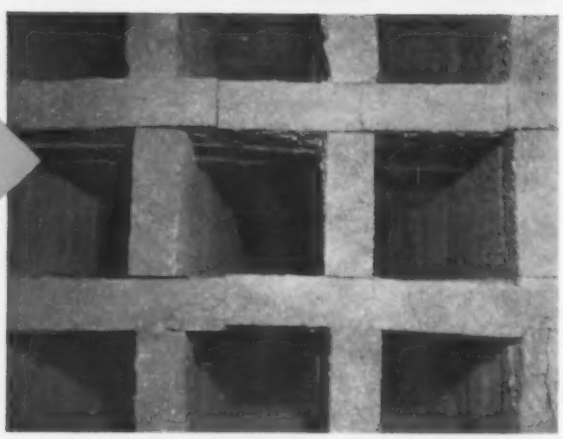
The friable character of the slight dust build-up is evident in this photograph.

CLEANED AND READY TO GO BACK INTO SERVICE they looked like this—



Cleaning is quickly and easily accomplished because Forsterite L Checkers resist slagging, spalling and clogging.

AFTER 1105 HEATS—cleaned and ready for more service—they still look like new!



The amazing durability of this magnesium-silicate refractory brick is clearly shown by the pictures. Furthermore, the mineral forsterite has inherent properties which give the checkers exceptionally high heat capacity. The results are longer life, easier and less frequent cleaning, and greater thermal efficiency of the checker settings.

World's Most Complete Refractories Service

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AND SUBSIDIARIES
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FATIGUE CRACKS

Help for Tired Hands

There's less worker fatigue these days in the TV-Radio Div. of Westinghouse Electric Corp.

Manufacturing engineers there came to the rescue of plant operators cutting printed circuit board leads with an ordinary pair of clippers. They went to work and fash-

ioned a power driven cutter (see photo) that even the frailest woman on the production line can handle with ease.

The mechanized unit, which moves at the rate of two cuts per second, was assembled from a small air cylinder, a trigger, a few links of chain, a spring, and a supporting frame.

Refresher Course

Time changes word meanings as well as everything else. Nowadays there's a new villain creating new meanings for many of our most common words—automation.

So with definitions courtesy of the National Office Management Assn. here are the new semantic interpretations of some old friends:

First off, an "error" is never to be confused with a "mistake." A mistake is something entirely different. Then a "branch" isn't part of a tree. It's a conditional jump. The new definition of "column" is a mouthful. It reads this way, "one of the character or digit positions in a positional notation representation of a unit of information."

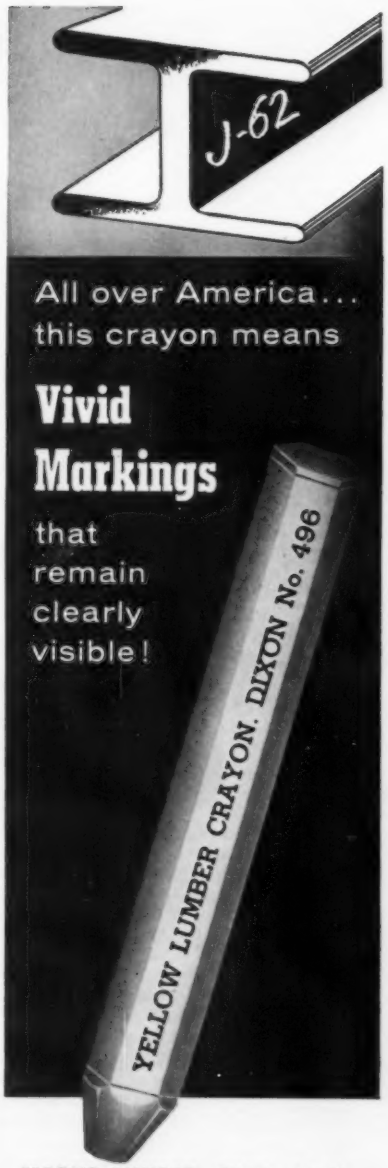
Things get even stickier a bit further on. The glossary won't even touch the word "memory." Scrap it for the term "storage," NOMA recommends.

We brightened up, however, when we got to the word "zero." It still means "nothing." But there's a qualification. Make sure whether you're talking about "plus zero" or "minus zero." There's quite a difference, you know.

New Puzzler

When I was a farmer lad and we sat down to the evening milking my father would pose a question like this: If a fish had a head 4 in. long and a body as long as his head and tail put together and a tail as long as his head and one-half his body, how long was the fish?

"I admit it looks silly, but it does have a psychological effect on them."



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Quaker State can guarantee you quality—more than that, they can guarantee you customized service; fast, dependable delivery; and even the development, research, design, and manufacture of any particular Aluminum product for you.

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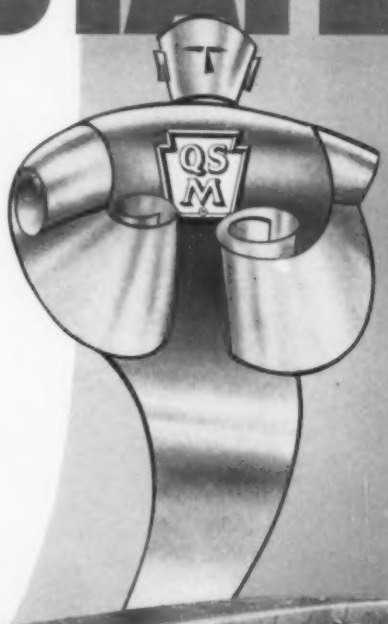

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COMING EXHIBITS

Materials Handling Show—June 9-12, Public Auditorium, Cleveland. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Automation Show—June 9-13, Coliseum, New York. (Richard Rimbach Associates, 845 Ridge Ave., Pittsburgh 12.)

Western Packaging & Materials Handling Show—Aug. 11-13, Civic Auditorium, San Francisco. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Chemical Show—Sept. 9-12, International Amphitheater. Chicago. (National Chemical Exposition, 86 E. Randolph St., Chicago 1.)

Packaging & Materials Handling Show—Oct. 14-16, Coliseum, Chicago. (SIPMHE, 327 S. LaSalle St., Chicago 4.)

Plastic Show—Nov. 17-21, International Amphitheater, Chicago. (The Society of the Plastics Industry, Inc., 250 Park Ave., New York 17.)

MEETINGS

JUNE

American Boiler Mfrs. Assn. and Affiliated Industries—Annual meeting, June 8-11, Skytop Lodge, Skytop, Pa. Society headquarters, 4062 Mayfield Rd., Cleveland.

Society of Automotive Engineers—Summer meeting, June 8-13, Chalfonte-Haddon Hall, Atlantic City, N. J. Society headquarters, 485 Lexington Ave., New York 17.

Malleable Founders' Society—Annual meeting, June 9-10. The Homestead, Hot Springs, Va. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

American Institute of Industrial Engineers — Annual national conference and convention, June 12-14, Hotel Statler, Los Angeles. Information: P. O. Box 22069, Los Angeles 22.

The American Society of Mechanical Engineers—Semi-annual meet-

(Continued on P. 16)

ALABAMA
Birmingham
Hinkle Supply Co., Inc.—FAirfax 2-4541
CALIFORNIA
Los Angeles
Meyer Sheet Metal Mchry. Co.—VAn Dyke 1477
San Francisco
Harron, Rickard & McCone Co.—ATwater 2-2202
GEORGIA
Atlanta
Allison Mchry. Co.—JAckson 4-1741
INDIANA
Indianapolis
E. L. Humston Co., Inc.—WAlnut 5-9691
IOWA
Bonaparte
Corry's Machine & Tool Co.—Phone: 112
KANSAS
Wichita
Elffeldt Mchry. & Supply Co.—AMherst 7-9773
MASSACHUSETTS
Cambridge
Austin-Hastings Co., Inc.—Kirkland 7-4480
MICHIGAN
Detroit
J. Lee Hackett Co.—TRinity 2-6442
MINNESOTA
Minneapolis
Minnesota Steel Supply Co.—FEderal 3-6273
MISSOURI
Kansas City
Elffeldt Mchry. & Supply Co.—VIctor 2-5494
NEW YORK
New York
Federal Machinery Corp.—CAnal 6-3022
Triplex Machine Tool Corp.—HAnover 2-4520
H. Weiss & Co.—CAnal 6-4256
NORTH CAROLINA
Greensboro
Armentrout Mchry. Co.—Phone: 4-8218
OHIO
Cincinnati
Cincinnati Mchry. Co., Inc.—TRinity 1-0853
Cleveland
George D. Miller Co.—MAin 1-1667
OKLAHOMA
Oklahoma City
Hart Industrial Supply Co.—REgent 9-2541
Tulsa
Hart Industrial Supply Co.—LUther 3-2175
OREGON
Portland
Pacific Metal Co.—CApitol 7-0693
PENNSYLVANIA
Philadelphia
Delaware Valley Mchry., Inc.—Willow Grove 4600
Milton Equipment Co.—WAlnut 2-1734
Pittsburgh
Wm. K. Stamets Co.—ATlantic 1-8091
TENNESSEE
Nashville
Pearl Equipment Co.—CHapel 2-5476
TEXAS
Dallas
Briggs-Weaver Mchry. Co.—LAkeside 8-0311
Fort Worth
Briggs-Weaver Mchry. Co.—EDison 6-5621
Houston
Mehl Machinery, Inc.—FAirfax 3-1313
WASHINGTON
Seattle
Pacific Metal Co.—MAin 6925
WISCONSIN
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Production Equip. Inc.—TEmple 2-3483
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Halifax—Phone: 5-4389
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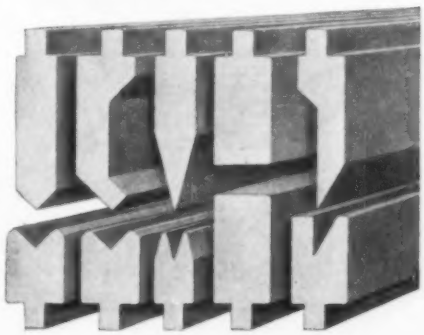
Hamilton—JAckson 9-5388
Ottawa—CEntral 6-3661
Toronto—EMpire 4-2381
Windsor—CLearwater 4-4762
QUEBEC
Montreal—RIverside 8-9381

8487

Off-the-shelf DELIVERY



CHICAGO®
*Induction Hardened**
PRESS BRAKE DIES

This organization of local distributors offers immediate delivery on many CHICAGO *induction hardened* press brake dies. These stock dies are economical, and the quick delivery saves time in tooling. They are available in any length from 4 to 12 feet in increments of 2 feet.

Stock dies are used for a surprisingly large variety of bending operations. And, with CHICAGO *induction hardened* dies you get bonus performance and increased die life at no extra cost. Remember, these dies can be used in any make or size of standard press brake.

On your needs for press brake dies, call your nearest distributor listed here. With Bulletin D-457 you can order by number. Ask for a copy.

*Induction hardening is a special, high-frequency process used to harden the wear surfaces of CHICAGO dies. Field reports on CHICAGO *induction hardened* dies show up to ten times longer life than conventional press brake dies.

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Special Metal-Forming Machines

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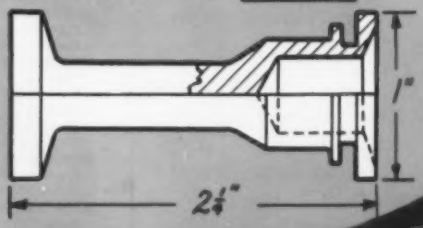
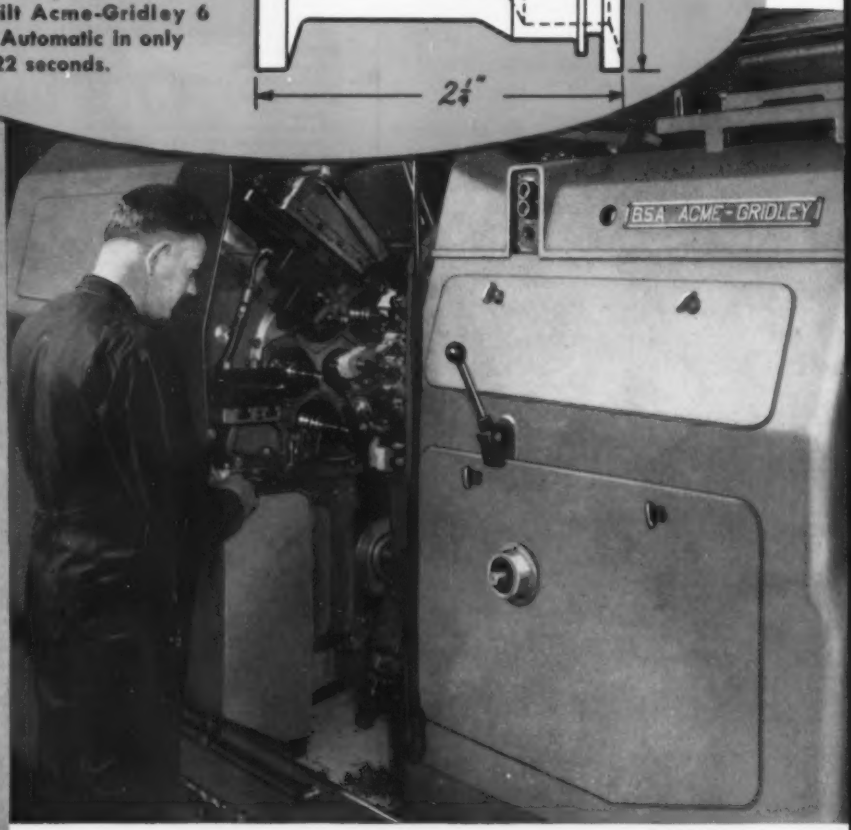
Chicago 36, Illinois

All 'round the world...

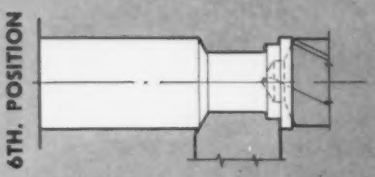
How Acme-Gridley BASIC DESIGN saves time in AUSTRALIA

This Piston Master Cylinder requires 14 operations to complete. All were performed on a British built Acme-Gridley 6 Spindle Automatic in only 22 seconds.

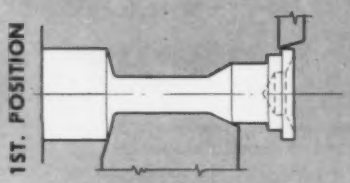




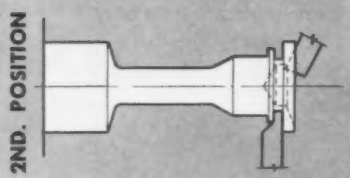
1⅝" Six Spindle Acme-Gridley Bar Automatic at work in a suburb of Sydney, Australia.



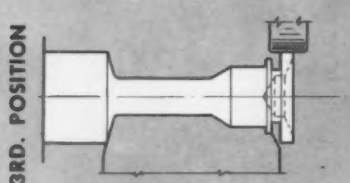
FEED OUT—FORM FRONT
HALF-DRILL PARTWAY



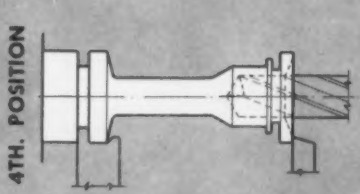
FORM BACK HALF
TURN HEAD DIAMETER



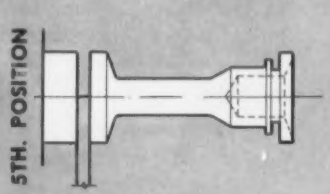
FORM GROOVE—
TURN INTERNAL CHAMFER



FINISH FORM—SUPPORT



FACE END
DRILL REMAINDER
FORM REAR AND
BREAKDOWN FOR CUT-OFF



CUT-OFF

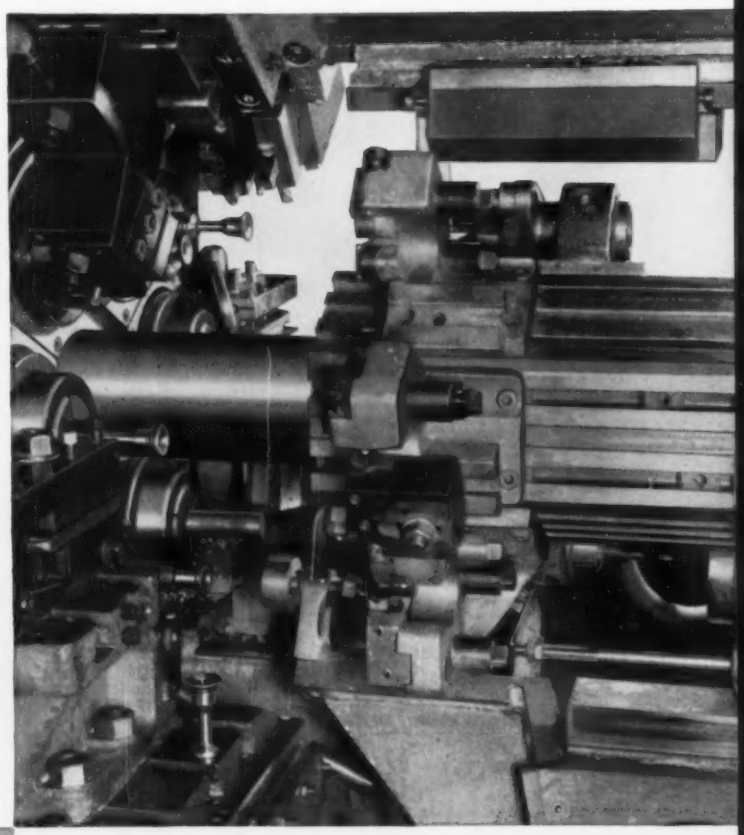
. . . where there's work to be done and time to be saved . . .

there's an Acme-Gridley to do it!*

If you were to walk down Tarrington Road in Sydney, Australia, you'd hear a busy whir that is a familiar sound in the metalworking plants of Detroit and Dusseldorf, Cleveland and Coventry. It's the sound of Acme-Gridley automatics producing metal parts at high speeds, great precision and maximum economy.

A typical example of Australian production is the piston master cylinder illustrated. This part, produced by Messrs. Duly & Hansford Pty. Ltd. of Sydney, is machined on a 6-spindle Acme-Gridley automatic from free cutting mild steel bars. The production cycle is 22 seconds—a tremendous saving in time over any other possible method.

This high speed—high quality production is typical of the way Acme-Gridley circumferential automation makes things faster—better—cheaper—all 'round the world. That's why we say "When there's work to be done and time to be saved, there's an Acme-Gridley to do it."



The wide-open tooling zone of Acme-Gridley Automatics provide extra capacities—extra versatility.

why don't you

INDEX . . . to lower machining costs . . . with *Acme-Gridley* **CIRCUMFERENTIAL AUTOMATION**

National Acme

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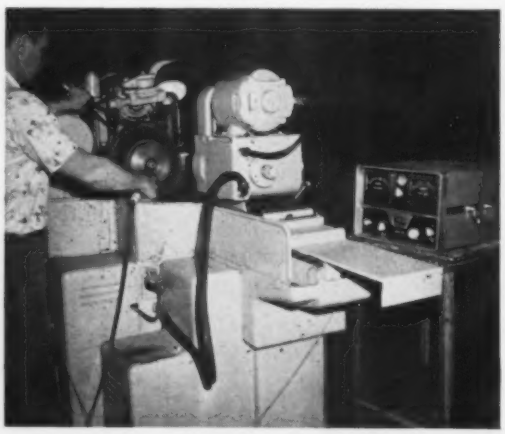
New **IRD** *system*
makes troubleshooting easy,
cuts machinery maintenance costs

Bearing failure, fatigue, chatter, vibration, wear, noise eliminated with new multi-purpose IRD system, like this . . .

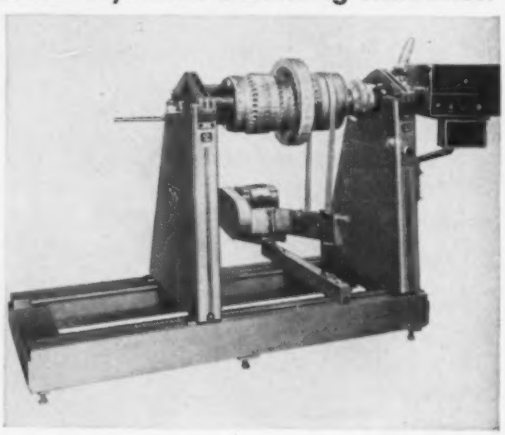
TROUBLESHOOTING
The portable Model 600 Vibration Analyzer pinpoints the parts causing machinery malfunction without costly dismantling, prescribes correction — reducing costly downtime.

IN-PLACE BALANCING
When the trouble is caused by imbalance, the Model 600 is used to dynamically balance rotating components at operating speed, in their own bearings, anywhere in your plant.



Avoid costly duplication of equipment by using the portable, multi-purpose Model 600 as the electronic brain of the IRD Dynamic Balancing Machines.

DYNAMIC BALANCING
IRD Models 101, 102, 103 dynamically balance motors, spindles, turbines, blowers and other rotating components simply, accurately and quickly.



Eliminate costly trial-and-error troubleshooting methods . . . make corrections accurately and quickly, balance components in place or separately. All these important functions are yours at a fraction of the cost of conventional, single-purpose balancing machines. Have an IRD man give you an in-your-plant demonstration, on your machinery.

IRD *systems*
INTERNATIONAL RESEARCH & DEVELOPMENT CORP.
6155 Huntley Rd., Worthington, Ohio
See us in Sweets' 1958 PE and MT files

EXHIBITS, MEETINGS

(Continued from P. 13)

ing June 15-19, The Statler Hilton Hotel, Detroit. Society headquarters, 29 W. 39th St., New York.

American Foundrymen's Society—Annual foundry instructors seminar, June 19-21, Castle Institute of Technology, Cleveland. Society headquarters, Golf & Wolf Rds., Des Plaines, Ia.

Alloy Casting Institute — Annual meeting, June 21-24, The Homestead, Hot Springs, Va. Society headquarters, 286 Old Country Rd., Mineola, N. Y.

American Society for Testing Materials—Annual meeting and exhibit of scientific apparatus and laboratory supplies, June 22-27, Hotel Statler, Boston. Society headquarters, 1916 Race St., Philadelphia.

Investment Casting Institute — Spring meeting, June 23-25, Occidental Hotel, Muskegon, Mich. Society headquarters, 27 E. Monroe St., Chicago 3.

Industrial Safety Equipment Assn., Inc.—Annual meeting, June 24-27, Oyster Harbors, Osterville, Mass. Society headquarters, 420 Lexington Ave., New York.

Drop Forging Assn.—Annual meeting, June 25-28, The Homestead, Hot Springs, Va. Information: D. M. Allgood, exec. vice president, Drop Forging Assn., Cleveland 13.

SEPTEMBER

National Petroleum Assn.—Annual meeting, Sept. 10-12, Hotel Traymore, Atlantic City, N. J. Society headquarters, Munsey Bldg., Rm. 958, Washington, D. C.

Steel Founders' Society of America—Fall meeting, Sept. 22-23, The Homestead, Hot Springs, Va. Society headquarters, 606 Terminal Tower, Cleveland 13.

Air Moving & Conditioning Assn., Inc.—Annual meeting, Sept. 22-25, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 2159 Guardian Bldg., Detroit 26.

no chipping - no rusting
no pitting - no peeling

no work - no worry

with ever-bright brightwork of

Superior stainless steel

Let it rain, mist or dew . . . for the lifetime of the car, stainless steel brightwork never needs care. Exposure to the elements can't harm it. You don't lift a finger or pay a penny to keep the showroom shine of *stainless*. ● Strong, hard, ever-bright stainless steel will serve you best on your new car, and protect top value when you sell. *And the chances are, it'll be* SUPERIOR.

Superior Steel

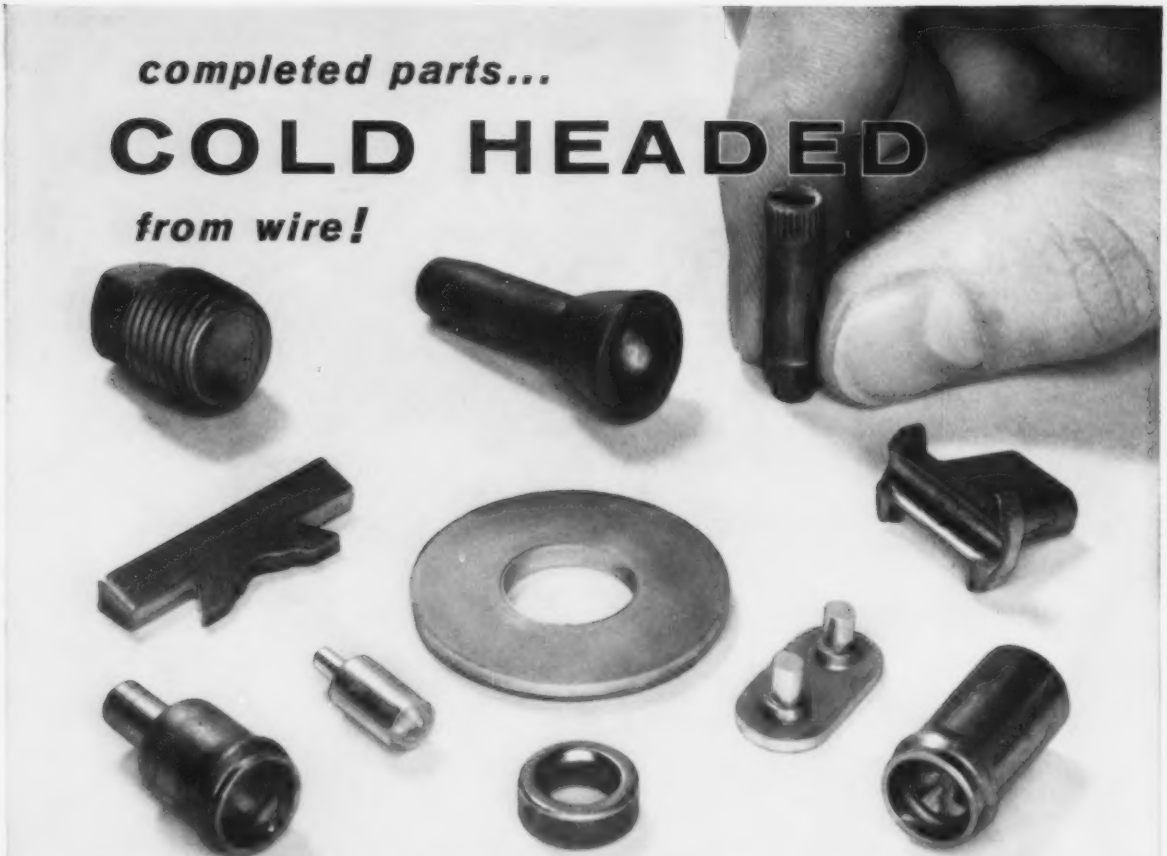
DIVISION OF

CARNEGIE, PENNSYLVANIA

completed parts...

COLD HEADED

from wire!



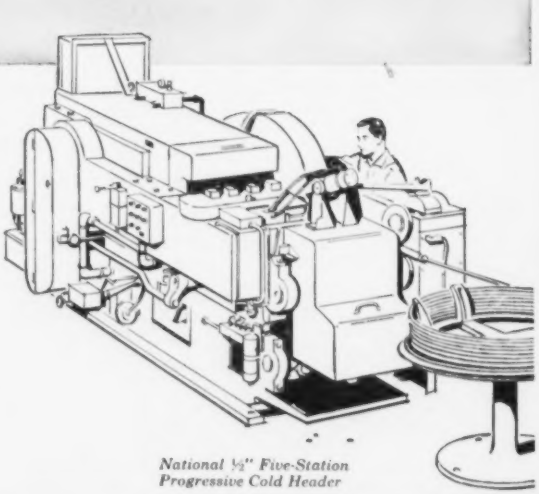
Top row, left to right: pipe plug, ball seat for push-rod end, splined square-head shaft. Middle row: commutator bar, solenoid contact, wire clamp. Bottom row: distributor cap insert, transistor case, spacer, link, distributor cap center wire insert.

All of the odd-shaped metal parts above were developed for fast, accurate production on National Cold Headers.

Complete and ready to use, these parts are made from wire, start-to-finish in one compact machine, at unbelievably high speeds with excellent die life, in most cases with no loss of material!

Production ranges from 40 parts per minute with stock of 1½" diameter up to 450 per minute in the ⅛" size. The jobs illustrated average 161 per minute.

Have you investigated Cold Heading? If you now have headers, have you considered widening your range and type of work to meet the growing requirements of metalworking?



National ½" Five-Station Progressive Cold Header

Founded 1874—DESIGNERS and BUILDERS of MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS CO-PIONEERS WITH INDUSTRY OF ADVANCED METALWORKING PRODUCTION METHODS

NATIONAL MACHINERY CO.

TIFFIN, OHIO, U. S. A.

HARTFORD DETROIT CHICAGO

Jack O'Sullivan's new grinding technique cuts costs and back-aches—(Bay State distributor Jack O'Sullivan of Engineered Sales Co., Summit, N. J.)

Jim Frederick proved that 1 wheel could out-perform 3 at Steelcraft Tool Co.—(Bay State distributor Jim Frederick of Industrial Abrasives Co., Detroit)

Vic Ericson helped make 1 wheel do the work of 12 at Whitin Machine Works. (Bay State distributor Vic Ericson of Johnson deVou, Inc., Worcester, Mass.)

Earl Singleton cut the costs of grinding heavy traction gears—(Bay State distributor Earl Singleton of Browning Tool & Supply Co., Indianapolis)

Be
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BAY STATE
WHEELS of PROGRESS

BAY ST
ABRAS

Better grinding at lower cost...

...that is their business

Don Kennedy cut snagging costs at a large East Coast shipyard. (Bay State abrasive engineer Don Kennedy)

Jim Lewis put one wheel to work on *two* machines! (Bay State distributor Jim Lewis of Lewis Sales Co., Cleveland)

Bun Walker is an expert's expert on roll grinding. (Bay State abrasive engineer Bun Walker)

John Martin beat his own best cut-off wheel by 50% – (Bay State distributor John F. Martin of Mau-Sherwood Supply Co., Cleveland)

The Bay State men shown on these two pages are typical representatives of a field organization that has built up a unique reputation for working out cost-cutting solutions to grinding problems.

Like these men, your own Bay State representative is a thoroughly trained abrasive specialist who puts service before salesmanship. Why not fill out the card at right and see for yourself?

TATE
SIVES

Mr. Elden L. Auker, Vice-President
Bay State Abrasive Products Co.
Westboro, Massachusetts

Dear Mr. Auker:

I would like to have one of your abrasive engineers call on me. I understand there is no obligation.

Name_____

Title_____

Company Name_____

Address_____

City_____ State_____

10 to 1

your grinding costs can be cut by men like these . . .

FIRST CLASS
Permit No. 2
Westboro, Mass.

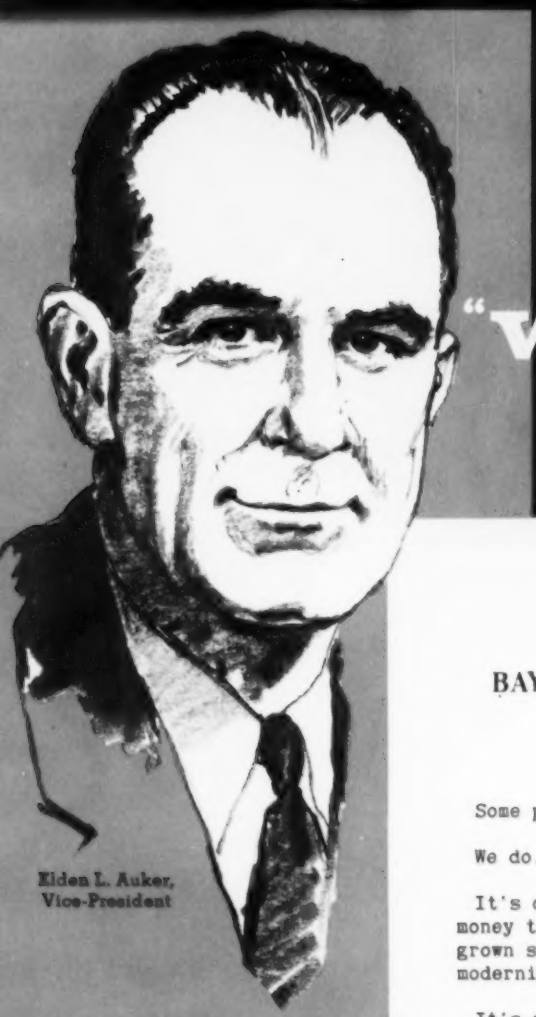
BUSINESS REPLY CARD

No postage stamp necessary if mailed in the United States

—POSTAGE WILL BE PAID BY—

MR. ELDEN L. AUKER, Vice-President
BAY STATE ABRASIVE PRODUCTS CO.
WESTBORO,
MASSACHUSETTS

Why not let a Bay State abrasive engineer study your grinding problems? Just fill out and mail this card and he will call.



Elden L. Auker,
Vice-President

"We want your toughest grinding problems..."

ESTABLISHED 1922
BAY STATE
WHEELS of PROGRESS

BAY STATE ABRASIVE PRODUCTS COMPANY

WESTBORO, MASSACHUSETTS U.S.A.
TELEPHONE WESTBORO FOREST 8-4433

Some people don't like to be called eager beavers.

We do. In fact, we're proud of it.

It's one reason why we devote so much time, effort and money to research and development . . . why our company has grown so fast and why we have been able to expand, modernize and remodernize our plants year after year.

It's also one reason why our field representatives are not only experienced and hard-working salesmen . . . but also genuine experts on grinding problems. They know their grinding wheels, of course . . . but they also know when to look beyond the wheel to solve the basic grinding problem.

That's why we feature our distributors and our company representatives in our advertising. We believe that the quality of Bay State products added to the knowledge and experience of men like those shown on the preceding pages make a combination that's rarely equalled, never surpassed.

How about letting us prove it?

Just fill in the enclosed card and mail it to me. We'll show you mighty quick what happens when you combine the best abrasive wheels on the market with real abrasive engineering service. No obligation, of course.

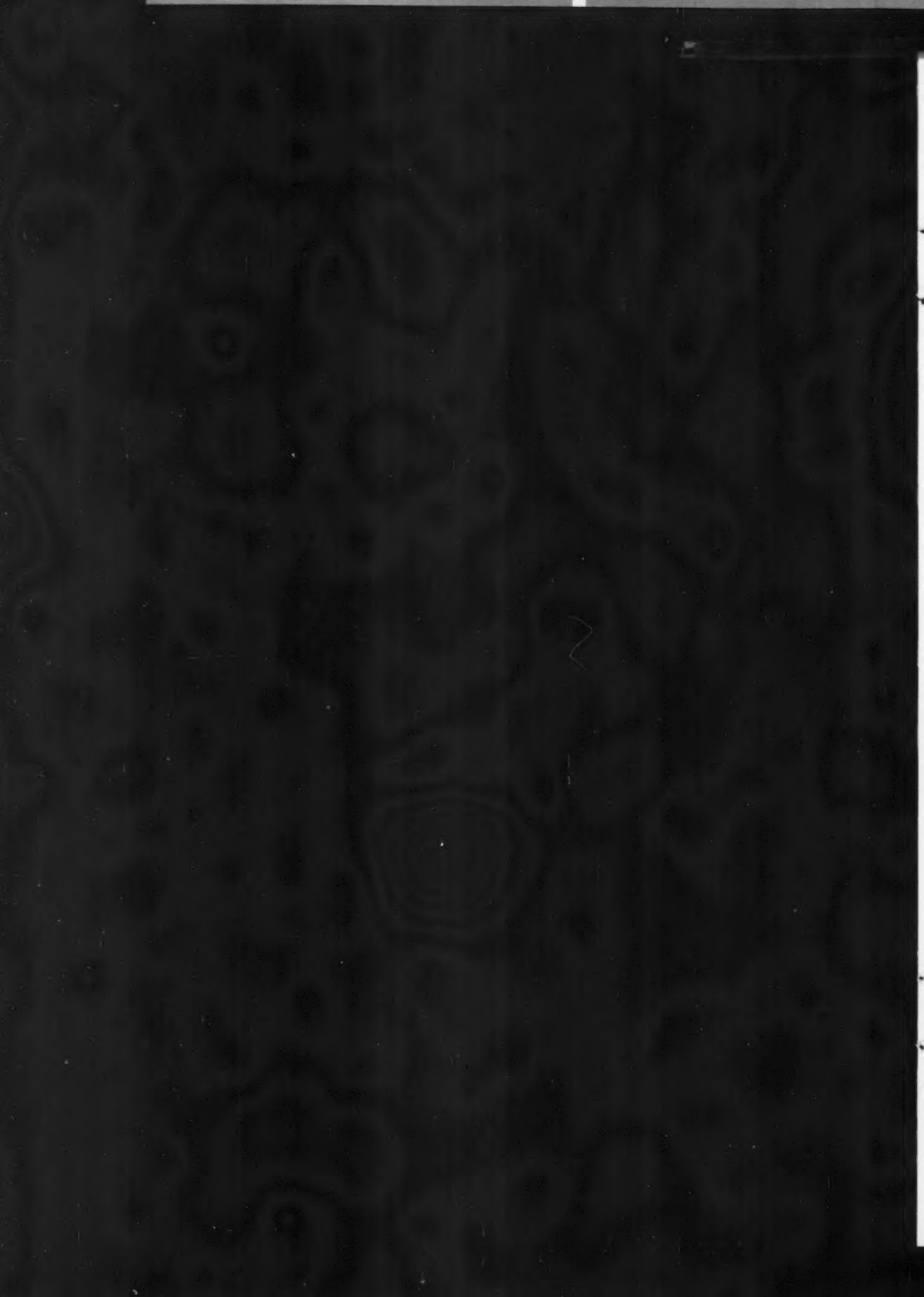
Sincerely,

Elden L. Auker

Elden L. Auker
Vice-President

BAY STATE
WHEELS of PROGRESS

BAY STATE ABRASIVES



Costs down, production up with Continuous-Cast Bronze Castings. There's no question about it—Asarco's unique process for producing continuous-cast shapes can save you money in many ways. And help you toward a better product in the bargain! For one thing, the alloys produced by continuous casting meet the same specifications as other castings but in performance, they're measurably superior. In fact, their greater strength and hardness open the way to cost-saving substitutions. And second, there's no greater production efficiency than working with the shapes you want in the continuous lengths you want, in dimensions closer to final finished parts. Write today for the cost-saving story on continuous castings. Continuous-Cast Products Department, American Smelting and Refining Company, Perth Amboy Plant, Barber, New Jersey; on the West Coast, Kingwell Bros., Ltd., 457 Minna St., San Francisco; in Canada, Federated Metals Canada, Ltd., Toronto and Montreal.

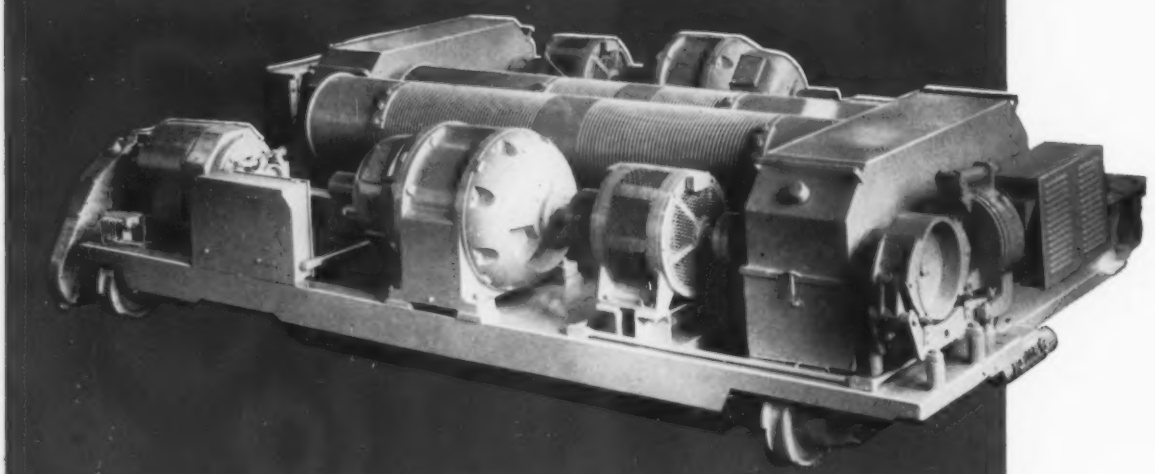
CONTINUOUS-CAST DEPARTMENT OF

ASARCO

AMERICAN SMELTING AND REFINING COMPANY

For Northern Cranes

EZOMATIC
CRANE CONTROL



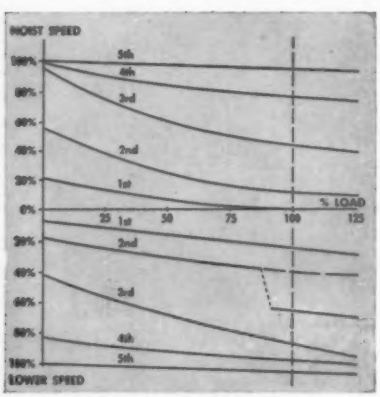
EZOMATIC *is Smooth, Simple, Dependable*

EASIER *to operate*

EASIER *to maintain*

EASIER *to understand*

EASIER *to handle any load*



TYPICAL SPEED CURVES WITH EZOMATIC CONTROL

The new simplified, smooth, accurate control for alternating current hoist motors utilizing full magnetic control combined with an eddy current brake. This improved control arrangement is easier to operate, easier to maintain, makes handling any load easier, safer, more accurate. Regardless of load the speed characteristics both hoisting and lowering are excellent, allowing smooth handling and accurate spotting of any load.

Standard control components familiar to all electrical maintenance and operating men are used throughout. Circuits are simple and readily understandable. No complicated electrical schemes. Used with a standard eddy current brake eliminating mechanical and electrical wear.

Excitation of the eddy current brake is automatically controlled by the motor speed allowing extra smooth acceleration. If fast acceleration is desired it may be obtained by moving the master switch to the last point, thereby eliminating the eddy current brake excitation. Off point braking is provided automatically to assist the motor brake in stopping the load. The motor brake is automatically applied in lowering if the eddy current brake excitation should be interrupted. Speed curves can be readily changed in the field, either up or down by a simple adjustment. When very heavy loads are handled extra lowering speeds are automatically provided.

For further information write to

NORTHERN ENGINEERING WORKS

210 CHENE STREET • DETROIT 7, MICHIGAN

2 STYLES OF LANDIS DIE HEADS

maximum PRECISION or ECONOMY

"Threading Efficiency" requires the selection of the proper die head for the job to be done, and is the essence of LANDIS design. To ensure that you may use the most efficient threading tool, LANDIS manufactures Die Heads in two basic styles:

HARDENED-AND-GROUND HEADS should be used where a high degree of thread-cutting accuracy is required. Their fundamental design and the inherent qualities of specially selected and hardened materials provide the maximum rigidity necessary for threading to Class 4 and Class 7 tolerances.

HEAT-TREATED HEADS are designed for the utmost economy when doing commercial threading, and will produce threads to Class 2 and 3 fits. The initial cost is small and rugged construction ensures trouble-free operation and few repairs. Wide range coverage requires minimum tool inventories, and along with the use of LANDIS Tangential Chasers allows maximum output per dollar of tool cost.

LANDIS Tangential Chasers are an important factor both in the economy and precision of these basic head styles. These chasers may be replaced or reground singly, can be used for 80% of their original length, and allow either style of die head to produce threads of the accuracy for which it is recommended.

LANDIS manufactures more than 100 sizes and types of standard and special Die Heads for use on threading machines, turret lathes, tapping machines and bar automatics. Let us suggest the Head most suitable for your needs—send specifications and ask for Bulletins F-80 and F-90.

LANDIS *Machine* COMPANY

WAYNESBORO PENNSYLVANIA

453

LOOKING FOR MORE FROM

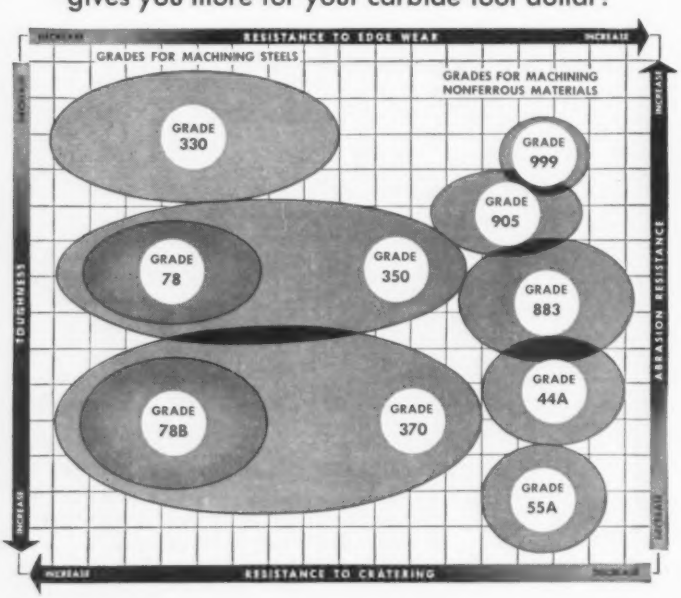
USE CARBOLOY® GRADE 78B General-Purpose carbide for top production—with low initial tool cost—on your steelcutting jobs

Long before anyone ever heard of "premium" carbides, Carboloy Grade 78B was doing a top-notch job as a high-quality, general-purpose steelcutting grade. It's *still* doing it—in thousands of plants where job requirements don't demand a carbide like Extra-Performance Grade 370.

On general-purpose steelcutting jobs, Grade 78B's lower initial cost pays off . . . and pays off handsomely. What's more, even on *tough* jobs, where runs are short, Grade 78B may prove itself the most economical carbide to use.

If you're not now using Grade 78B for general-purpose machining—or its companion, Grade 78 for finishing and light roughing—chances are you *should!* Order these two low-cost carbides from your Authorized Carboloy Distributor . . . today.

This complete team of Carboloy cemented carbides gives you more for your carbide tool dollar!



YOUR CARBIDE TOOL DOLLAR?

USE CARBOLOY® GRADE 370 Extra-Performance carbide on tough steelcutting jobs, for lower cost-per-piece, and long production runs

Carboloy Extra-Performance Grade 370 is the carbide to use where tool-cost-per-piece on heavy-duty jobs is eating up company profits. And it pays off, too, where production schedules demand longer-lasting tools to keep high-production machines in continuous profitable operation.

Grade 370 is the carbide everybody tries to match when it comes to roughing and interrupted cuts. But nobody does. Grade 370 stays sharp longer—at higher speeds and feeds—than any other heavy-duty carbide on the market.

Today, thousands of metalworking men are realizing significant production economies on heavy-duty jobs because Extra-Performance Grade 370 more than lives up to its name. Together with the other Carboloy Extra-Performance carbides—Finishing Grade 330 and Medium-Duty Grade 350—it can help you put a halt to declining profits. Just order from your local Authorized Carboloy Distributor. Then count the extra production you'll get . . . at lower cost-per-piece!

To get all the facts on Carboloy Extra-Performance Grades 330, 350, and 370—and General-Purpose Grades 78 and 78B—write: Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Ave., Detroit 32, Michigan.

CARBOLOY®
CEMENTED CARBIDES

GENERAL ELECTRIC

FLORIDA...

industrially proved

1204 new industrial plants were established between January, 1956, and December, 1957, including all 21 "manufacturing" industries listed by Standard Industrial Classifications; bright outlook for metalworking subcontractors; no state income taxes.

Today, with cold, hard facts at their command, Florida businessmen can paint a picture of real industrial accomplishment.

For instance, in the two years from January, 1956, through December, 1957, 1204 new industrial plants were set up in the Sunshine State. There's diversity, too: all 21 types of industry regarded as "manufacturing" by Standard Industrial Classifications are represented in the State.

A broader look

During the past decade, Florida's picture of industrial progress has far exceeded U.S. averages:

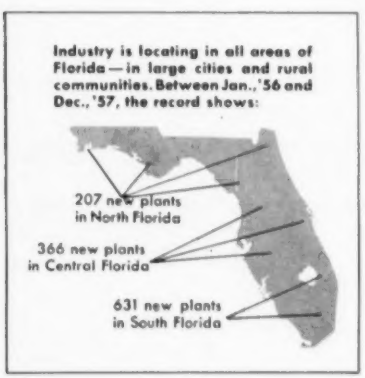
Manufacturing employment up 74% from 1947 to 1957—U.S. average, 10%.

Expenditures on new plants and equipment up 60% from 1947 to 1955—U.S. average rose 37%.

Manufacturing payrolls up 190% from 1947 to 1957—U.S. average went up 87%.

Who's here, how they're doing

The roster of new arrivals is impressive: Sperry-Rand in Gainesville, General Electric in St. Petersburg, Martin Co. in Orlando, Chemstrand in Pensacola—the list goes on and on.


Industry is locating in all areas of Florida—in large cities and rural communities. Between Jan., '56 and Dec., '57, the record shows:
207 new plants in North Florida
366 new plants in Central Florida
631 new plants in South Florida

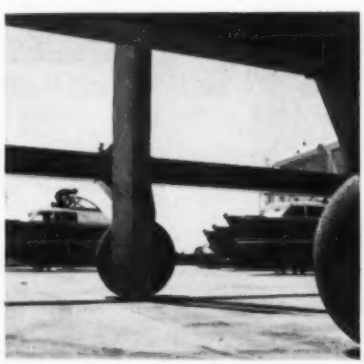
Excepting that used in manufacturing aircraft, Florida fabricating plants now use 25% of all aluminum produced in the entire U.S.

Many of these companies, and others, are talking about the bright outlook fast-growing Florida offers for sub-contractors—particularly in metalworking. From one end of the State to the other, companies cite tremendous sub-contracting opportunities in precision metal work, heat treating and finishing.

Florida firms in all fields are getting along splendidly from virtually every standpoint. Consider, for example, what Florida's manpower picture has meant to management here:

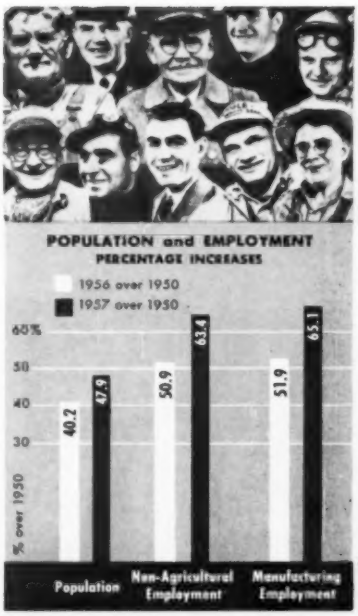
Absenteeism: An officer of Radiation, Inc., Melbourne, reports, "Absenteeism because of illness due to bad weather is almost unheard of." A Pan American Airways spokesman in Miami says key workers are easier to keep because of Florida's pleasant living conditions.

Skilled labor: Readily recruitable in all fields. Pratt & Whitney, West Palm Beach, advertised for engineers, found applications for Florida jobs outdrew New England, California, and the Midwest by more than 20 to 1.



Chris-Craft Corp. moved its main offices to Pompano Beach last year, is building cruisers in its new home.

But the best criteria of industrial success are Florida's many plant expansions and additions. Typical examples: Escambia Chemical Corp., Milton, recently built a new plant for producing polyvinyl chloride, is completing another for the manufacture of methanol. Burlington Hosiery Co., Green Cove Springs, upped its labor force 400% in three years. In Miami, Eastern Air Lines, National Airlines, Pan American Airways and Northeast Airlines are all building or planning to build major jet aircraft maintenance bases.



From Dec., 1956, to Dec., 1957, Florida led all other states in numerical gain in manufacturing employees.

ADDITIONAL FLORIDA NOTES: State and local governments and communities want industry, cooperate in helping firms get established . . . no State income taxes, corporate or individual . . . state-wide natural gas is in the offing . . . transportation is excellent.

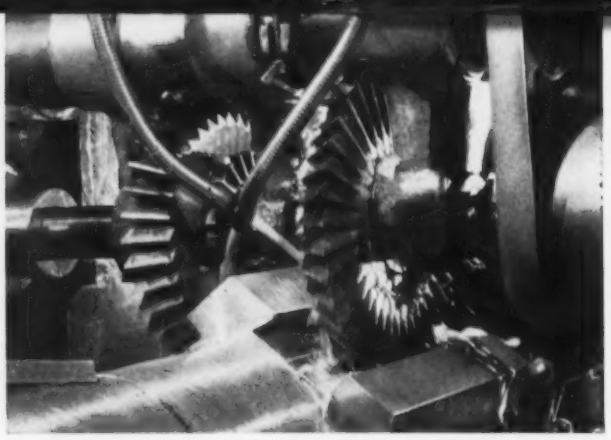
Florida facts, figures . . . and surveys

The Industrial Services Division of the Florida Development Commission has prepared all-new factual studies on Markets, Manpower, Taxes, Transportation, Resources, Living Conditions, Research, Power and Water. These studies are available to you at your request.

In addition, the Industrial Services Division will gladly conduct special studies and assist in selecting sites. All inquiries are held in strictest confidence. Write today to Florida Development Commission, 3713-1A Caldwell Building, Tallahassee, Florida.

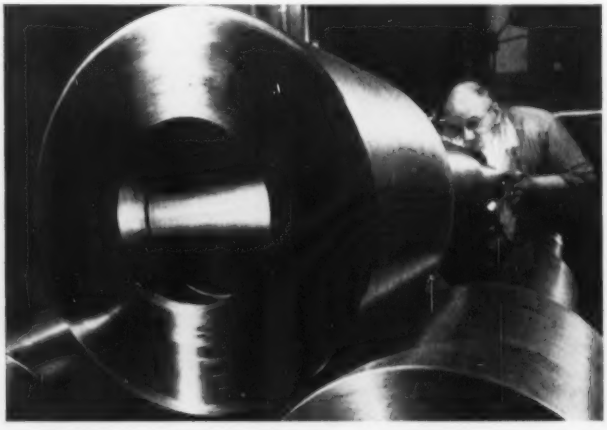
Come see Industrial Florida for yourself. Write State of Florida, Dept. M, Caldwell Bldg., Tallahassee, for new 100-page color Vacation Guide Book to help plan an all-Florida tour.

SAVES $150 PER GEAR—In cutting a double-web design fabricated gear on a gear generator, tool cost formerly averaged $180 per gear. By switching to ALCO Hi-Qua-Led Steel with its lower friction component, tool wear is reduced, and manufacturer reports savings of approximately $150 per gear.



MILLING TIME DOWN 71%—Hi-Qua-Led Steel open-die forgings enabled a machine tool builder to reduce time for straddle-mill dovetailing of pentagon shape by 71%. Overall time for piece, including milling, turning and trepanning, is cut 33%, and a significant saving in tools is also noted.

IMPROVED FINISH—A manufacturer reports a much smoother gear finish with ALCO Hi-Qua-Led Steel. There is a complete lack of burrs which formerly required extensive hand filing to remove. In addition, time for this cutting operation on a Fellows gear shaper is reduced 47%, and tool wear is down 20%.

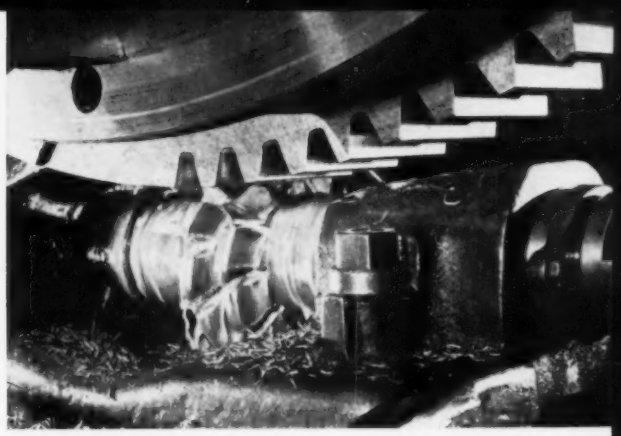


700% INCREASE IN TOOL LIFE—In trepanning a 4 in. diameter hole 42½ in. long with a Warner & Swasey lathe, tool life averaged one piece per tool. With Hi-Qua-Led, 8 pieces are now obtained with the same tool. Manufacturer reports that Hi-Qua-Led Steel also provides much better chip formation.

EASY-MACHINING HI-QUA-LED STEEL* FORGINGS GIVE INDUSTRY NEW OPPORTUNITY FOR PROFIT

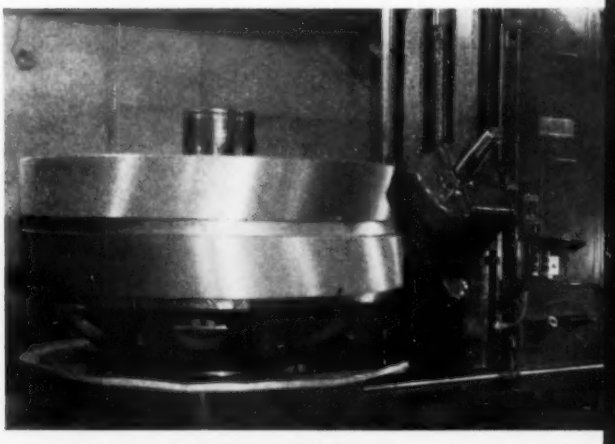
* **HI-QUA-LED STEEL**—ALCO's registered trademark for its new process leaded-steel forgings that are making outstanding reductions in tool wear, machining time and production costs.

TOOL DOES 3 TIMES THE WORK—With Hi-Qua-Led Steel, a King boring mill operation that once required 3.4 hours is off the machine in 43 minutes. Through the lower frictional properties of Hi-Qua-Led Steel, the manufacturer obtains 10 pieces per tool grind as compared to 3 pieces obtainable with non-leaded steel.



8-HOUR JOB DONE IN 3—Another manufacturer reports that roughing and finishing a gear required a total of 8 hours and 8 minutes on his gear cutter. With free-machining Hi-Qua-Led Steel and the increased speeds and feeds it permits, the job is now completed in just 3 hours and 10 minutes.

FASTER SPEEDS, NORMAL TOOL WEAR—A gear manufacturer using a Fellows gear cutter was able to increase rough-cut speed 37% and finish-cut speed 111% with Hi-Qua-Led Steel. Smoother operation is noted, and the tremendous reduction in machine time is accomplished with only normal wear to cutter.



SAVES FULL WORK WEEK—Using gear blanks of ordinary steel, roughing and finishing on a Gould and Eberhardt machine previously required 65.1 hours. The improved machining qualities of Hi-Qua-Led Steel have speeded up gear production and the job is now completed in 24.9 hours, saving a 40-hour work week.

The easy machinability of ALCO's Hi-Qua-Led Steel® forgings is setting new production records and boosting profit throughout industry. While maintaining all the physical characteristics of regular steel in any AISI grade, forgings of Hi-Qua-Led Steel, ALCO's special process leaded steel, provide the extra benefits of greatly reduced machine time, longer tool life and improved surface finish. In addition, the reduced friction component of Hi-Qua-Led Steel forgings assures much closer tolerances.

By switching to ALCO's Hi-Qua-Led Steel forgings in your operation, you can cut your machining costs drastically. Along with this reduction in costs, Hi-Qua-Led Steel forgings will provide the same service in your end product as you obtain with regular forgings.

ALCO specialists are available to show you—on your own machines, in your own plant—how Hi-Qua-Led Steel forgings will boost your profit. Forgings are available in seamless rolled circular shapes from 18 to 145 in. OD, in open-die shapes from 1,000 to 30,000 lb and 40 ft long, and in mandrelled seamless circular shapes up to 60 in. wide. Contact the ALCO sales office nearest you for complete details. For a booklet containing technical information on Hi-Qua-Led Steel forgings, write ALCO Products, Inc., Dept. 153, Schenectady 5, New York.

ALCO

ALCO PRODUCTS, INC.

NEW YORK

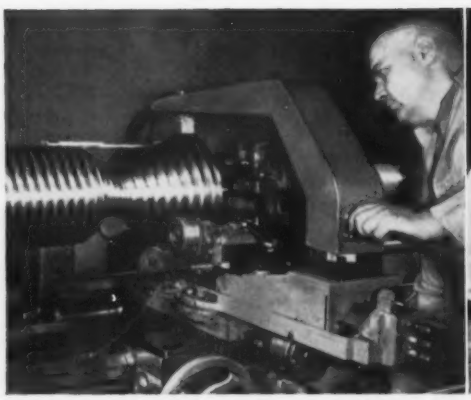
SALES OFFICES IN PRINCIPAL CITIES

LOCOMOTIVES · DIESEL ENGINES · NUCLEAR REACTORS · SPRINGS · STEEL PIPE · FORGINGS · OIL-FIELD EQUIPMENT

RIGHT ON THE NOSE— AND EVERYWHERE!

Grinding complex missile shapes, in many cases, would be either costly, difficult, impossible or all three. Monarch Air-Gage Tracer users produce finishes of 17-18 micro-inches **regularly**—some of which are polished to 2-3 micro inches. Good enough—and no grinding problem! (Above—unretouched photo of die mold for plastic nose cone turned to a 16-18 micro-inch finish)

Monarch
TURNING MACHINES
ACCURACY • ECONOMY • LONG LIFE
FOR A GOOD TURN FASTER . . . TURN TO MONARCH



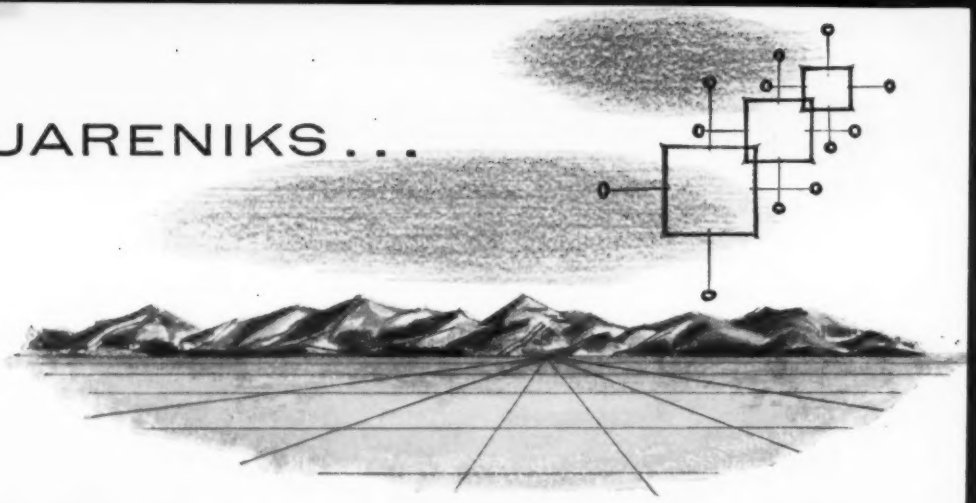
WHAT IT TAKES:

Air-Gage Tracer Control, Swiveling Action—a Monarch exclusive. Only with this equipment can you generate—in a single machining set up—the exacting, complex, often exceedingly thin-walled contours demanded by missile hardware. Tracer-controlled single point turning is mandatory for accuracy needed for critical parallelism, squareness and concentricity—and cheaper, too! (above a helix combustion chamber)

GREAT ON THE FACE OF IT

Numerous Monarch lathes afford you the advantages of constant surface cutting speed—so important to speed and finish in the facing of large, thin-walled work. Shown is a facing operation on a ram-jet turbine disc. Machine is a Monarch Model F Right Angle Lathe, swinging 60" in gap, equipped with Air-Gage Tracer Controls and constant surface cutting speed operating on both sides of center.

want SQUARENIKS...



THE MONARCH SWIVELING AIR-GAGE TRACER

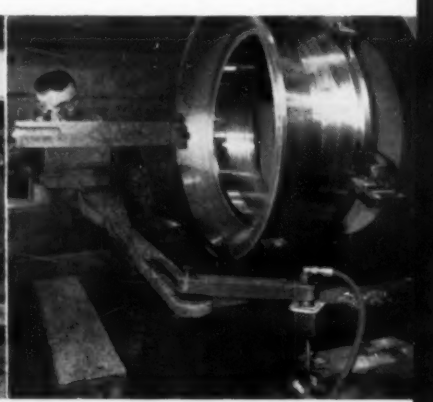
is a missile and rocket making "must"

"Many jobs can be performed satisfactorily only on Monarch swiveling Air-Gage Tracer lathes," says one of the country's leading experts in the field.

Today, missile manufacturing is in its infancy. Even so, Monarch tracer lathes have proved themselves wherever used. And that is in most plants where missile components are being produced. Both swiveling and rigid types are employed. Adaptable to such work are all sizes from the small 10" Model EE to the largest Heavy Duty Lathes, plus the Mona-Matics and the Right Angle Lathe.

Profit by the experience of others. Check the applications pictured and described below. Then ask us for the whole story. Finally, remember we are talking about the same Air-Gage Tracer that is improving production and lowering costs in thousands of plants throughout metal working.

THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO



SELF-GAGING TURNING!

This rocket propellant chamber component is simple compared to some shapes. How's to gage them? Even expensive gaging fixtures can't always fill the bill. So what? With the close repetitive accuracy of Monarch Air-Gage Tracing, intricate parts are accepted based on the accuracy of the flat template used. Light (6-8 oz.) stylus pressure precludes template wear.

MULTI-THOUSAND DOLLAR QUESTIONS—AND EVERY ANSWER RIGHT!

What's to do when you spoil pieces in this business? Especially ones that might cost up in the thousands before machining (Not shown, but we've seen 'em!) Cut your throat? No—rely on the .0001" constant repetitive accuracy of your Air-Gage Tracer slide movement—**and don't spoil any!**

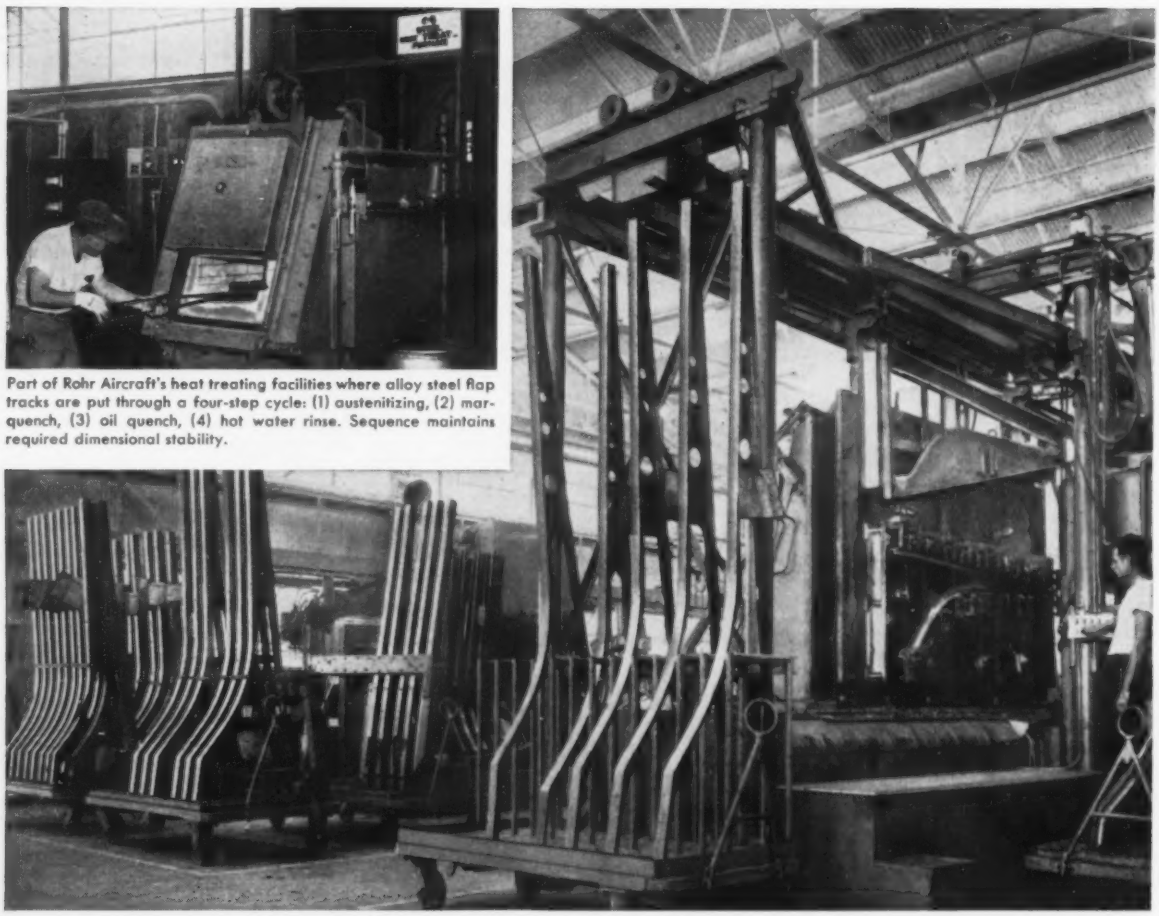
IT DON'T MEAN A THING IF IT AIN'T GOT THAT SWING

You need size in this business now—and they're designing bigger all the time. That extra-large work can be Air-Gage Traced overall on a Monarch. The turbine housing above is a typical example. But we're not stopping here. **If present Monarch sizes don't meet your actual anticipated needs, let us talk over greater swing designs with you.**

Problem-Solving Products from Republic

Increase Strength/Weight Ratios, Cut Costs, Save Weight, Maintain Dimensional Stability

Part of Rohr Aircraft's heat treating facilities where alloy steel flap tracks are put through a four-step cycle: (1) austenitizing, (2) marquench, (3) oil quench, (4) hot water rinse. Sequence maintains required dimensional stability.



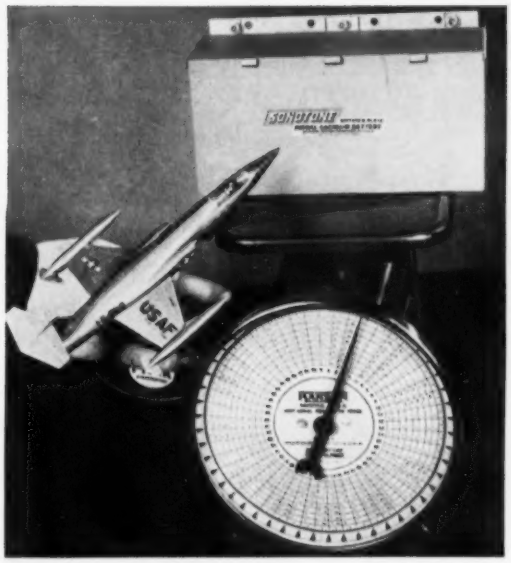
ALLOY STEEL MEETS HIGH STRENGTH, PRECISION REQUIREMENTS IN USAF BOMBERS. Steel weldments produced by Rohr Aircraft Corporation, Chula Vista, California, are an excellent example of the aircraft industry's constant effort to develop better and more economical methods of mass-producing large, high-strength structural aircraft components.

Rohr is currently using this weldment technique in manufacturing flap tracks for an Air Force bomber. The flap tracks are fabricated from AMS 6428 Alloy Steel, a type supplied by Republic. This fine steel provides a minimum tensile strength of 180,000 psi in the heat treated condition. Uniform response to heat treatment assures exceptionally good deep hardening characteristics—plus hard, wear-resistant surfaces.

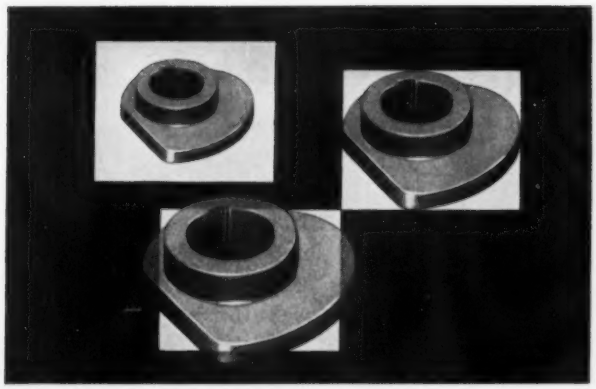
The exceptionally high strength-to-weight ratio of Republic Alloy Steel combined with the highest strength values permits the design of thinner, lighter track sections to save weight and hold down size without sacrifice of strength or safety.

Rohr's development of specialized tooling, welding, and heat treating techniques permits the production of these alloy steel weldments to close tolerances—a rigid aircraft engineering requirement. Costs are reduced by eliminating the need for expensive equipment and excess stock removal.

Specify Republic Alloy Steel for your parts that must be tough, strong, dependable. Our metallurgists are always available to help you in selection and processing. The coupon is your invitation to use this obligation-free service.



REPUBLIC STAINLESS STEEL, Type 302, cuts costs, saves weight, resists corrosion in jet aircraft storage battery cases made by Sonotone Corporation, Elmsford, New York. Stainless steel's exceptionally high strength-to-weight ratio and ability to withstand impact and vibration permits the use of a lighter gage, thus saving weight. Sonotone reports the metal's outstanding corrosion-resistance eliminates the need for painting the cases with no detrimental effect on service or appearance. Republic Stainless Steel also resists the wide extremes of temperature and atmosphere through which the batteries must operate. Mail the coupon for more facts on Republic ENDURO® Stainless Steel.



REPUBLIC IRON POWDERS with Controlled Dimensional Factor give your parts predictable dimensional characteristics after sintering. CDF means that in the presence of copper, Republic Iron Powder—depending on type—can be made to grow, shrink, or remain stable within acceptable tolerance limits. Tool engineers can design tools to part-print dimensions with the assurance that tolerances, transverse to the direction of pressing, can be held within ±.001 inches per inch. Fabricators can produce consistently uniform sinterings at faster rates and at minimum cost. Republic Booklet Adv-763 contains complete details. Send coupon for your copy.

REPUBLIC TITANIUM ALLOYS are used for weight saving and elevated temperature applications in the B-58 Hustler. The supersonic bomber is built for the Air Force by Convair, a division of General Dynamics Corporation, Fort Worth, Texas. These particular titanium alloys have minimum tensile strength of 130,000 psi and a minimum yield strength of 120,000 psi. Among the strongest alloys now being produced, they meet the demand for high strength to resist the effects of aerodynamic heating in supersonic aircraft, such as the B-58. Republic metallurgists and engineers, pioneers in the development of high strength-to-weight metals, are ready to help you apply titanium to your product or process.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

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Have a metallurgist call.
☐ Alloy ☐ Stainless Steel
☐ Iron Powder ☐ Titanium

Send more information on these Republic products:
☐ Alloy Steel ☐ Stainless Steel
☐ Iron Powder ☐ Titanium

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

GOOD WAY TO LOWER YOUR INVENTORY– SHIP UNITED AIR FREIGHT

Your inventory seeks its lowest practical level when you ship by United Air Freight.

You can centralize operations, replenish stocks on demand in a matter of hours. No need to maintain costly warehouses in all your markets. You can reserve air freight space on one of United's more than 900 daily passenger or all-cargo flights. And you can depend on United's fleet-wide radar for top on-time performance.

Add to these features the low packaging and insurance costs, nation-wide market coverage and personalized service that begins the minute you telephone, and you have distribution unmatched in efficiency.

The cost? United shippers report over-all distribution costs are actually lowered by shipping United Air Freight. Ship United and see for yourself.

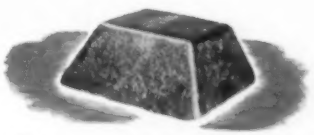
For service or information, call the nearest United Air Lines representative or write Cargo Sales Division, United Air Lines, 36 South Wabash Avenue, Chicago 3, Illinois.

It costs no more for extra dependability —on United, the Radar Line

UNITED AIR LINES

"Metallic yield goes up with pig-cast ferrosilicon"

Now steel producers can increase silicon recoveries and simplify handling operations with new pig-cast 75% ferrosilicon from ELECTROMET. The pigs provide a convenient, uniform lump size for ferrosilicon additions to steel. They produce a higher, more consistent metallic yield because fines are practically eliminated. Ready solubility is achieved because pig additions penetrate the molten steel very quickly. The uniform shape and 20- to 25-pound weight of the pigs make handling easier in both unloading and furnace operations. Your ELECTROMET representative will gladly give you further information.



Pigs are easy to handle and give a high metallic yield.

Electromet
FERRO-ALLOYS AND METALS

UNION CARBIDE

ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y.

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

3 IMPORTANT DEVELOPMENTS in the NEW "68" PRECISIONAIRE

Slash Air Gaging Costs—Speed Inspection

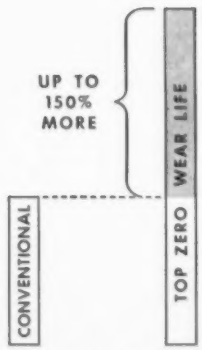
TOP ZERO TOOLING

Top Zero processing offers a choice of three ways to save:

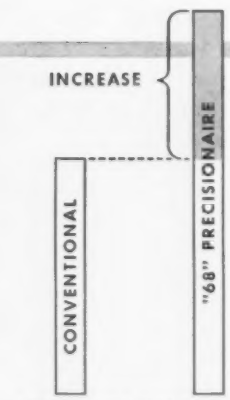
A Spindle wear life can be increased up to 150% beyond conventional practice.

or B Spindle clearance can be markedly increased to assure quickest entrance of the spindle into the work in process gaging.

or C Both wear life and clearance can be significantly greater than is possible with conventional processing, to get OPTIMUM PERFORMANCE



GREATER TOOL WEAR LIFE



LENGTH OF USABLE LINEAR SCALE

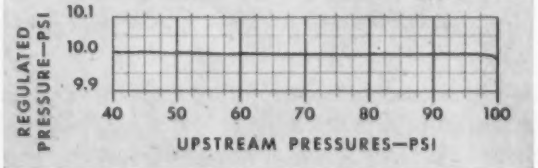
LONGEST LINEAR SCALE

A full 8" of truly linear scale and column permits the checking of wider tolerances at higher amplification—also more selections and fewer borderlines when classifying.

New "68" Series Plunjets and Adjustable Airbore Gages are truly linear over the full 8" scale

NEW HIGH-PRECISION IN AIR PRESSURE REGULATION

The new Sheffield "CONSTANTAIRE" regulator used in the "68" Precisionaire sets a new standard for precise, stable and trouble-free air regulation. After two years of field testing on a wide scale, it has proved successful even on applications where pressure fluctuations of 0.1 lb are critical



CONSTANTAIRE PERFORMANCE CURVE

ALL THESE EXTRA ADVANTAGES AT NO INCREASE IN THE PRECISIONAIRE PRICE

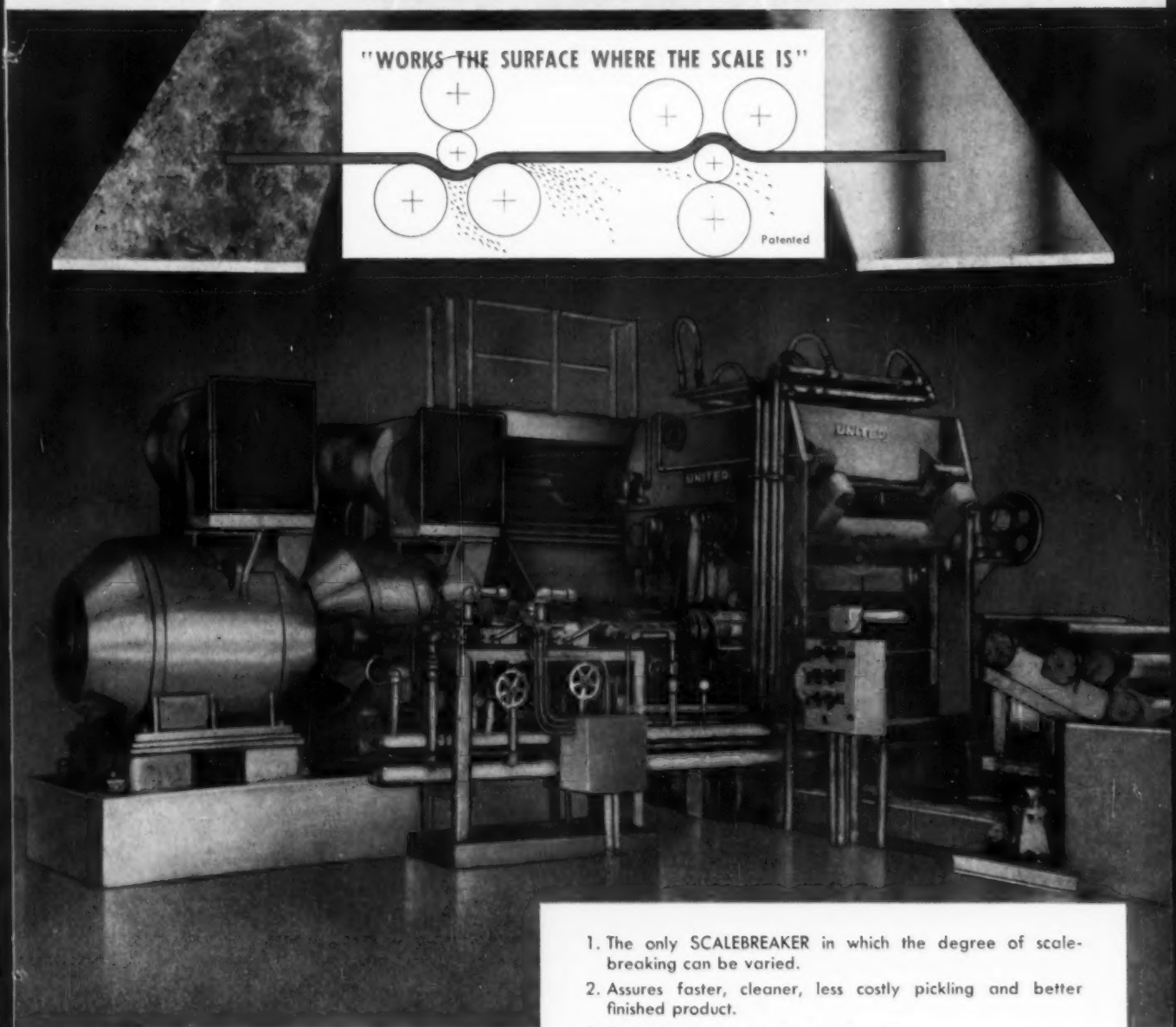
8026

Write for descriptive bulletin to the ***Sheffield Corporation, Dayton 1, Ohio, U.S.A., Dept. 8.***

the **SHEFFIELD** *corporation*
of Bendix Aviation
manufacture and measurement for mankind

UNITED®

NEW *Strip Processing* SCALEBREAKER



1. The only SCALEBREAKER in which the degree of scale-breaking can be varied.
2. Assures faster, cleaner, less costly pickling and better finished product.
3. Easily installed in existing pickling lines.

Write today for complete engineering data.

UNITED

ENGINEERING AND FOUNDRY COMPANY

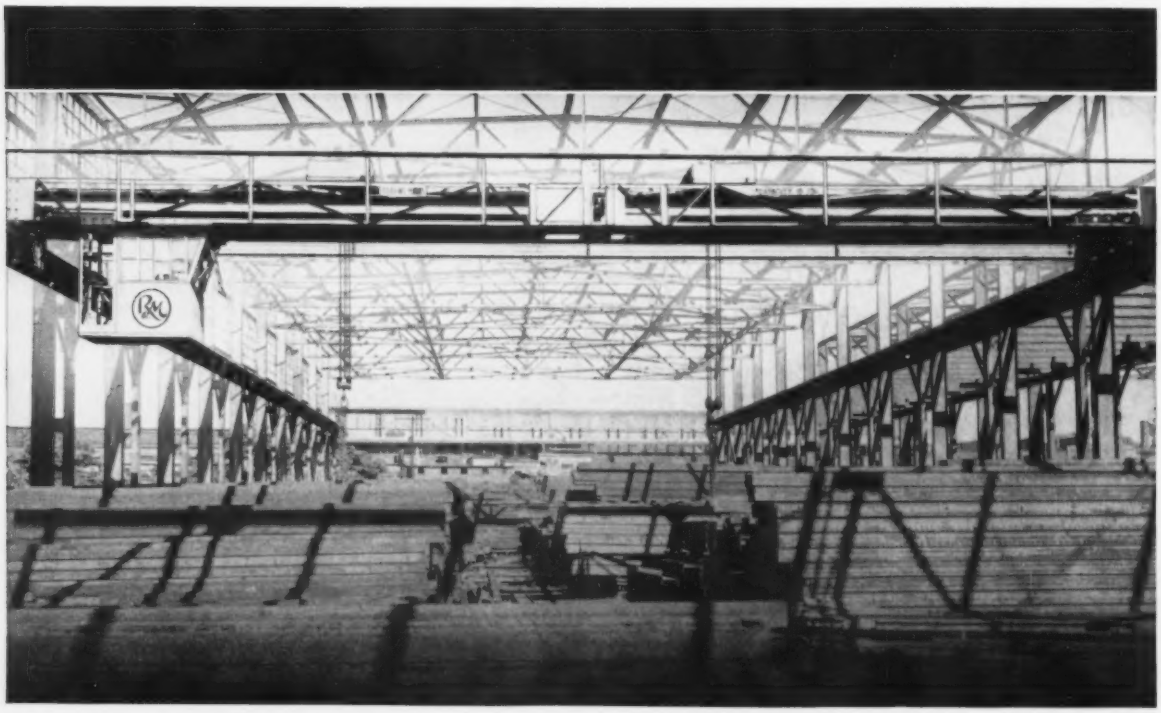
PITTSBURGH, PENNSYLVANIA

Plants at: Pittsburgh • Vandergrift • Youngstown • Canton • Wilmington

Subsidiaries: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

cranes that stay new



Robbins & Myers cranes have long, productive lives because they combine conservative engineering with quality construction materials—a combination that doesn't permit short-cut manufacturing. Carefully controlled standards are maintained for bridge deflection under load, rigidity, service factor. Your R & M crane is completely assembled and tested before shipment, then match-marked and doweled for perfect reassembly in your plant. R & M builds standard cranes with capacities to 10 tons, spans to 65 feet; larger capacities and longer spans are available in custom designs.

Illustrated above: 15 ton capacity, two hoist, cab controlled crane. Span: 74½ feet. Bridge control: 6 step variable speed to 250 fpm. Trolley control: 4 step variable speed to 125 fpm.

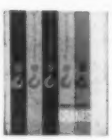
Send today for our new bulletin describing single and double girder cranes in top-running and underhung designs.

Robbins & Myers, Inc., Hoist & Crane Div., Springfield, O.

take it up with

ROBBINS & MYERS

holsts cranes



Request Bulletin 900

Quality in Ascendancy

The superiority of the vast number of products that are—and can be made from Roebling Cold Rolled Flat Spring Steel is a fact known throughout all industry.

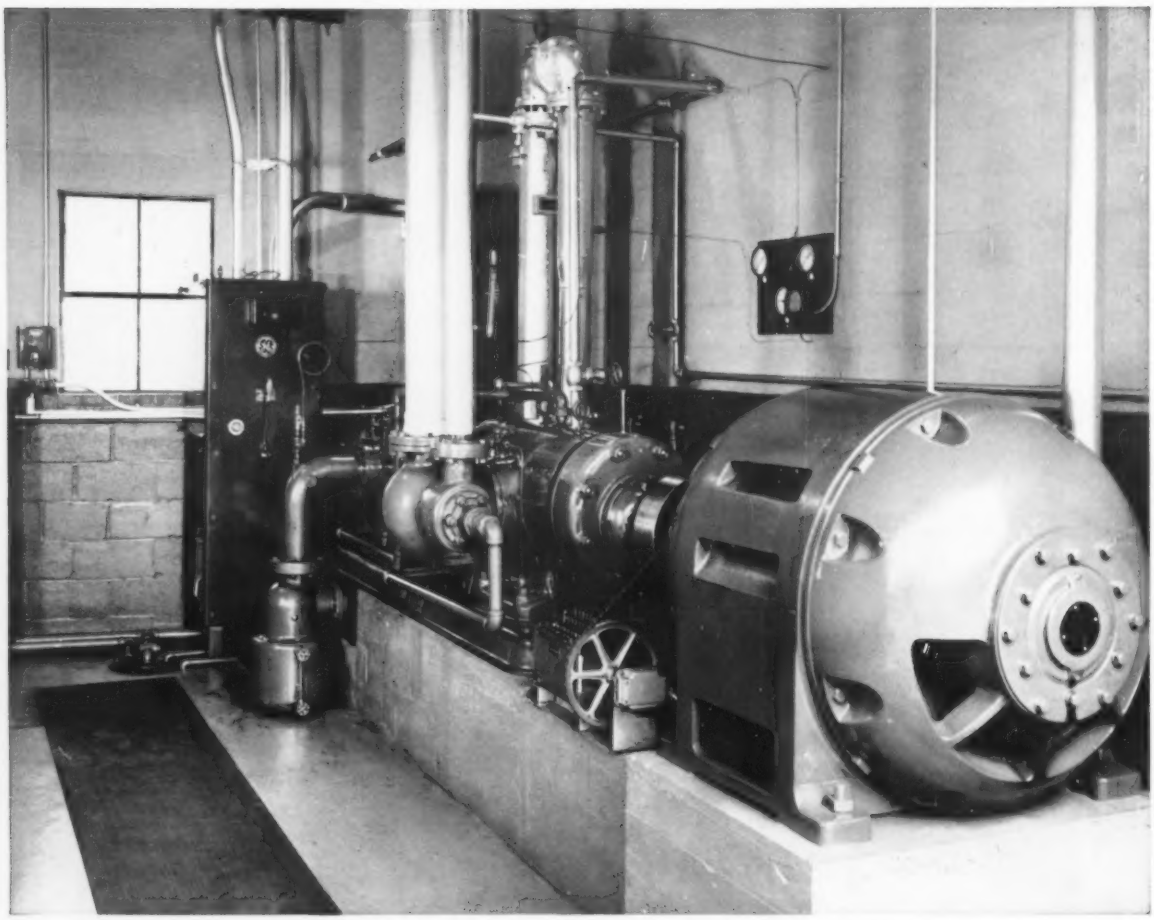
You pay for mechanical and dimensional uniformity when you buy flat spring steel...you *get* it when you buy Roebling.

For information on how our products can help *yours*, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Roebling...Your Product is Better for it



Fuller Rotary Two-Stage Compressor, C135-135H. Capacity 680 c.f.m., 100-lb. pressure, 690 r.p.m., 150 hp. motor.

16,000 HOURS OF OPERATION WITH NO MAINTENANCE

Empire Steel Castings, Inc., Reading, Pennsylvania, installed a C-135-135H Fuller Rotary Two-stage Compressor in April 1953. After 32 months—approximately 16,000 hours of operation—the compressor received a routine inspection, when a new set of blades was installed in the higher-pressure cylinder.

The Empire engineers report no downtime since replacement, although they've added 4,000 operating hours. Prior to switching to Fuller, their former experience with compressors was a different story—as many as several overhaulings in one year. With Fuller equipment furnishing a constant high capacity air supply, production costs have been greatly reduced.

Here's how Empire uses compressed air:

- In the molding department, supplying all air for pneumatic rammers, all squeeze and jolt machines, automatic set-out and lifting apparatus of mold conveyors, automatic shake-out machines, mold cleaning and spraying equipment.
- In the core department, for ramming equipment, spraying and torch drying equipment, core oven operation as well as core blowing equipment.
- In the cleaning department, pneumatic chipping hammers and grinders, blacksmith requirements, sand-blasting, pressure testing and miscellaneous tools.
- In the heat-treating department, heat treating furnace operation and cooling equipment.

To get all the facts and engineering data, write today for Bulletin C-5A.

FULLER COMPANY
GENERAL AMERICAN
TRADE MARK

FULLER COMPANY
122 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Chicago · San Francisco · Los Angeles · Seattle · Kansas City · Birmingham

Fuller

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

A word to the refractory-wise on . . .

How to make good use of bad times

Remember how management not long ago kept pressuring for "more production." There was no time then for analyzing productive efficiency. So a mild recession isn't all bad . . . *if it gives you badly needed time*—time to spot areas where you can cut operating costs.

For instance: It's highly probable that there are several areas where you could save by substituting one of our special-purpose refractory materials. Especially in "vulnerable" areas exposed to flames, abrasion, corrosion, high heat or heavy loads. Or, in "working" areas where the heat must pass *through* the refractory evenly and rapidly.

For example: One of our customers replaced his fireclay hearth with our CARBOFRAX® silicon carbide refractory and in one year eliminated 30 days downtime . . . In the walls of a retort, the high thermal conductivity of this same material made possible a new vertical redistillation process for the production of special high-grade zinc . . . In the floor of another furnace, CARBOFRAX refractories outlasted alloy parts 6 to 1. The examples are countless—as are the variety of materials applied.

Granted, Carborundum's refractories cost more. But they also *save* much more—in terms of refractory life . . . furnace downtime . . . and maintenance costs. They also *do* more—in terms of higher furnace output . . . faster heat transfer . . . and increased efficiency. In short, *we* wouldn't be in business if *you* couldn't cut costs with super refractories.

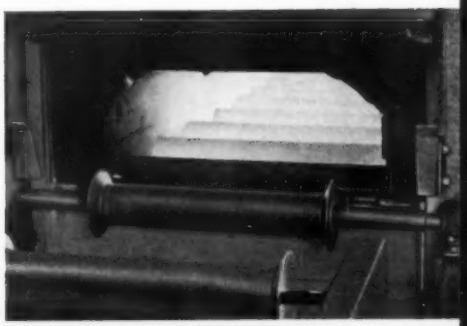
Here's how you can start cutting costs: It will take less than an hour to read these two booklets about the applications—**and properties**—of Carborundum's unique, new super refractories. Send for them today.

Subscription to "Refractories" is yours for the asking. This technical brochure is published approximately every other month; contains a wealth of information on new refractory materials, lining techniques, etc. Offer limited.

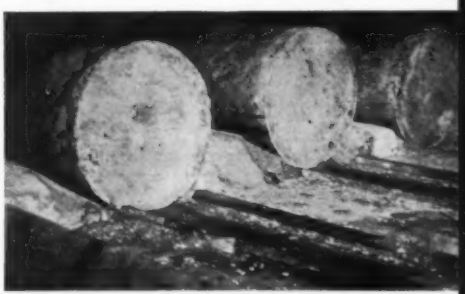
Refractories Division, The Carborundum Company, Perth Amboy, New Jersey, Dept. B-68.

CARBORUNDUM

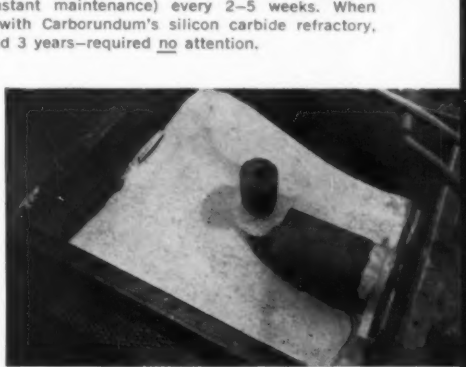
Registered Trade Mark



HEAT? Instead of using metal rollers, the manufacturer of this annealing furnace substituted a roller hearth made of one of Carborundum's special refractories. As a result, the hearth now stays straighter, lasts longer, and reduces marking and pick-up.



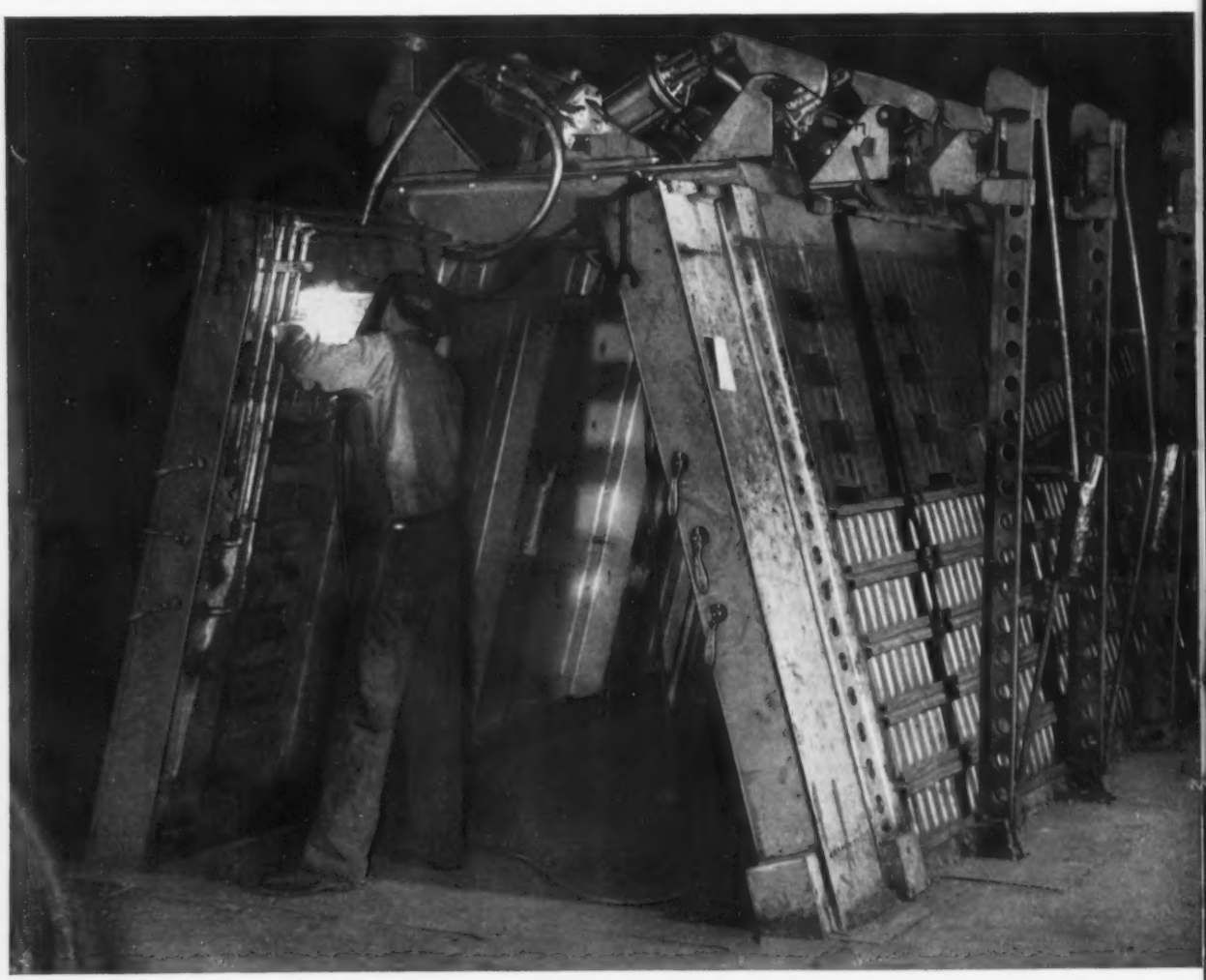
ABRASION? The skid rails supporting these billets were formerly alloy. They required complete replacement (plus constant maintenance) every 2–5 weeks. When replaced with Carborundum's silicon carbide refractory, they lasted 3 years—required no attention.



ATMOSPHERES? This furnace is heated to 3000°F by moly wire wrapped around the muffle. The muffle is made of our fused aluminum oxide—and insulated with our granular alumina "bubbles." These refractories have proved stable and durable—are not even affected by hydrogen or cracked-ammonia atmospheres.

For whatever you make . . .

N-A-X® HIGH-TENSILE STEEL BUILDS IN STRENGTH WITH LONGER LIFE



Today's emphasis on fast mechanized freight car loading and unloading brings the superior qualities of N-A-X HIGH-TENSILE steel into sharp focus.

For boxcar flooring, increased mechanization means bigger, heavier and faster moving lift trucks, added abuse from still more weight concentration. For gondola flooring, increased mechanization means still more load impact and abrasion to go with the deteriorating effects of constant exposure to weather.

N-A-X HIGH-TENSILE steel solves these troublesome problems like none other. Used in Stran-Steel Corporation's famous N-S-F®, nailable steel flooring, N-A-X HIGH-TENSILE builds in extra strength, adds longer life. And top resistance to impact and atmospheric corrosion, plus ready weldability, makes N-A-X HIGH-TENSILE exceptionally suited to the special needs of railroad equipment manufacturers and railroads alike. No wonder sixty-three of the nation's leading railroads have ordered N-S-F for their freight cars.

CHECK THESE IMPORTANT ADVANTAGES FOR YOUR JOB:

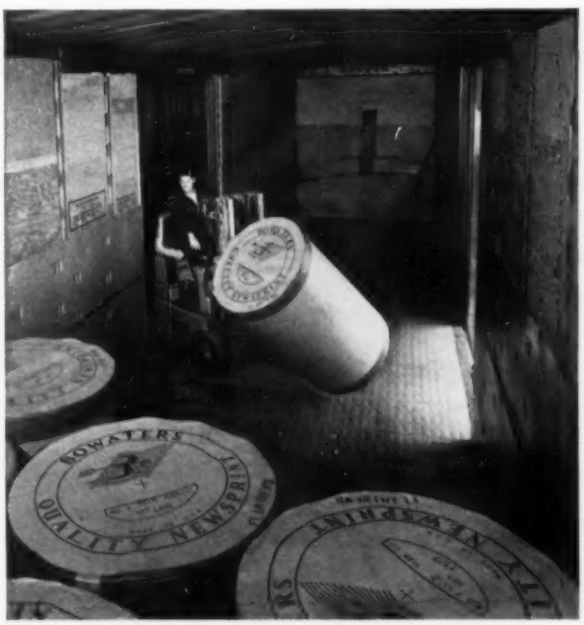
N-A-X HIGH-STRENGTH steels—both N-A-X HIGH-TENSILE and N-A-X FINEGRAIN—compared with carbon steel, are 50% stronger • have high fatigue life with great toughness • are cold formed readily into difficult stampings • are stable against aging • have greater resistance to abrasion • are readily welded by any process • offer greater paint adhesion • polish to a high luster at minimum cost.

Although N-A-X FINEGRAIN'S resistance to normal atmospheric corrosion is twice that of carbon steel, N-A-X HIGH-TENSILE is recommended where resistance to extreme atmospheric corrosion is important.

For whatever you make, from steel shop boxes to steel freight cars, with N-A-X HIGH-STRENGTH steels you can design longer life, and/or less weight and economy into your products. Let us show you how.

Here again N-A-X HIGH-TENSILE *steel proves its ready weldability. To manufacture Stran-Steel Corporation* N-S-F®, *nailable steel flooring, no less than* eight *separate welds between each two channels are required.*

Tough N-S-F®, *nailable steel flooring of* N-A-X HIGH-TENSILE, *has already won wide acceptance with leading railroads everywhere. So much so, in fact, that more than 50% of all new boxcars now being built are ordered with it.*



This typical modern fork-truck with its giant newsprint roll weighs a whopping 5,500 pounds! N-A-X HIGH-TENSILE *takes even this kind of concentrated abuse easily, lasts for the life of the car.*

N·A·X
HIGH-STRENGTH STEELS

N-A-X Alloy Sales Division, Dept. #A-5

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • Division of

NATIONAL STEEL CORPORATION

N-A-X Alloy Sales Division, Dept. #A-5
Great Lakes Steel Corporation, Detroit 29, Michigan

☐ Please send me 12-page illustrated technical catalog on N-A-X HIGH-STRENGTH steels.

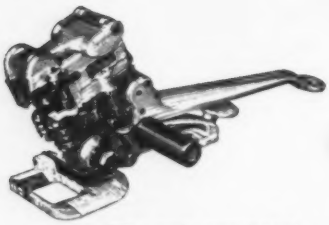
☐ Please have your representative contact me.

Name_____ Title_____

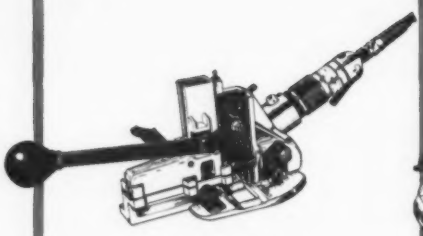
Company_____

Street_____

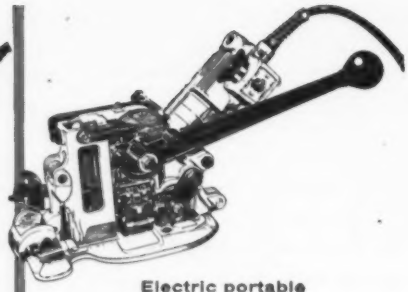
City_____ Zone____ State_____



The only one-hand strapping tools
SFC Series



Air power portable strapping machines
AP Series



Electric portable strapping machines
AE Series

Complete line of air power stretchers
PN Series

Heavy-duty air power stretchers with cutter
WN Series

Heavy-duty air power sealers
N Series

Make your product cost less to handle, store, ship, and receive

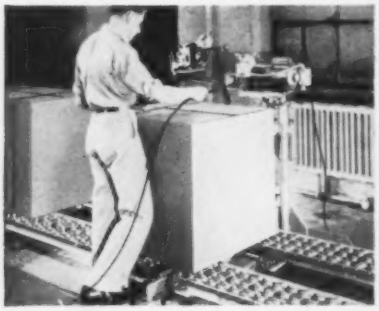
Binding things together with steel strapping is a low cost way to eliminate individual handlings, save space, and prevent damage. These nine machines—part of the most complete line of equipment in the steel strapping industry—create new ways to save with strapping. Signode will be glad to help you select the right equipment and devise methods to make the most of it. There's a Signode man near you. Call him today, or write:

First in steel strapping

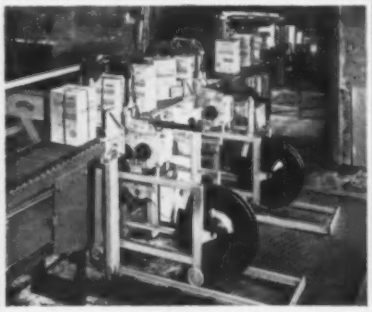
SIGNODE STEEL STRAPPING CO.

2623 N. Western Avenue, Chicago 47, Illinois

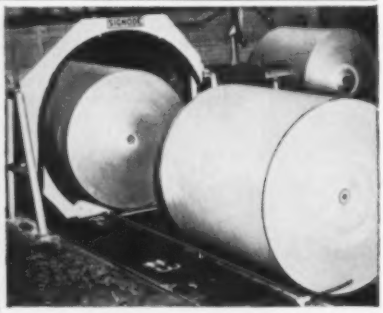
Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto



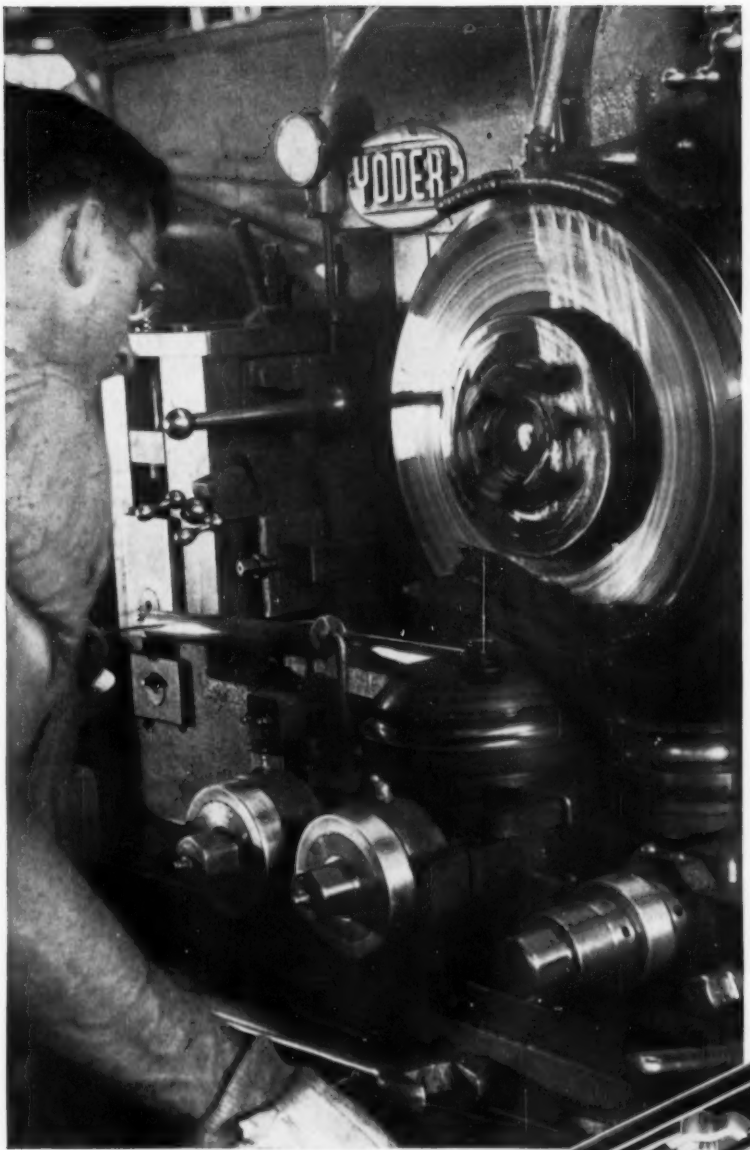
The only power strap feeders
Model PSF



The only fully automatic carton strapping machines Model M2N



Fully automatic roll and coil strapping machines Model M20RB



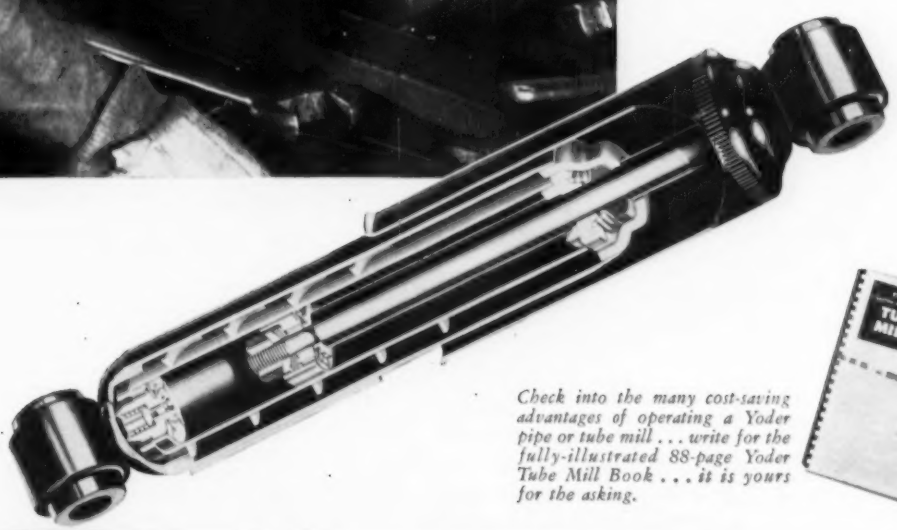
Monroe Shock Absorbers rely on performance of YODER Tube Mills!

After 15 years of continuous operation the Yoder Type-M Electric-Resistance Weld Tube Mill shown here, is still producing precision tubing for the Monroe Auto Equipment Co., Monroe, Michigan.

Yoder produced tubing is the basic component of the famous "Monro-Matic" shock absorber. Measuring 2 1/64" outside diameter (plus several other sizes) the tubing is made from 22 gauge strip in one continuous operation . . . it is automatically cold-roll formed, welded and cut to pre-determined lengths.

This typical installation of a Yoder tube mill exemplifies the accuracy, dependability and production economies of Yoder-made tubing. If your business requires pipe or tubing, ferrous or non-ferrous, in sizes from 1/4" to 26" diameters, there is a Yoder mill designed to produce it economically, efficiently and accurately.

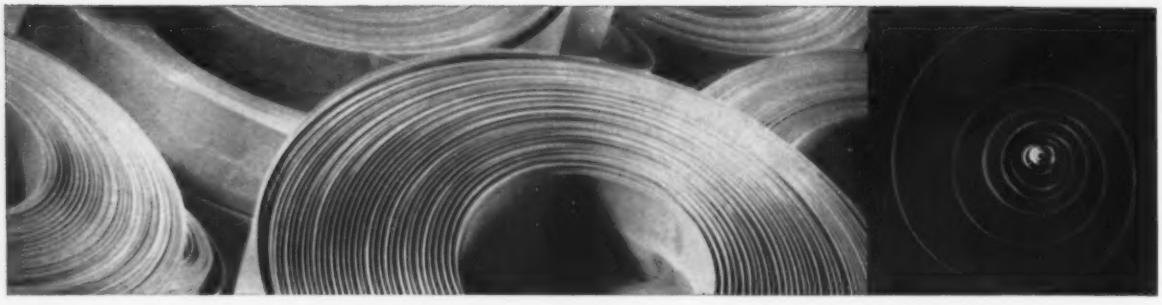
THE YODER COMPANY
5510 Walworth Avenue • Cleveland 2, Ohio



Check into the many cost-saving advantages of operating a Yoder pipe or tube mill . . . write for the fully-illustrated 88-page Yoder Tube Mill Book . . . it is yours for the asking.

ENGINEERING **YODER** MANUFACTURING

PIPE AND TUBE MILLS (ferrous or non-ferrous)
COLD ROLL FORMING MACHINES
ROTARY SLITTING LINES



Check your requirements against these

Wallace Barnes Cold-rolled Specialty Steels

Furnished in these carbon grades:

1.25 – 1.32% .90 – 1.05% .70 – .80% .59 – .74% .48 – .55%

ANNEALED AND HARD-ROLLED

Thickness

.003 – .010″	in widths	1/8 to 6 1/4″	
.011 – .014″	“ “	3/16 to 11″	
.015 – .019″	“ “	3/16 to 13″	
.020 – .035″	“ “	1/4 to 13″	
.036 – .049″	in widths	3/8 to 13″	
.050 – .064″	“ “	1/2 to 13″	
.065 – .093″	“ “	3/4 to 6 1/4″	
.093 – .125″	“ “	3/4 to 6 1/4″	

HARDENED AND TEMPERED

Scale-free or scaleless; polished*; polished and blued*; polished and strawed*

Thickness

.003 – .004″	in widths	1/8 to 2″	
.005 – .007″	“ “	1/8 to 3″	
.008 – .009″	“ “	1/8 to 4″	
.010 – .014″	“ “	3/16 to 5″	
.015 – .019″	“ “	3/16 to 7″	
.020 – .025″	“ “	1/4 to 8 1/2″	
.026 – .030″	“ “	1/4 to 8″	
.031 – .035″	in widths	1/4 to 7″	
.036 – .040″	“ “	3/8 to 7″	
.041 – .049″	“ “	3/8 to 6″	
.050 – .060″	“ “	1/2 to 4″	
.061 – .064″	“ “	1/2 to 3″	
.065 – .093″	“ “	3/4 to 3″	

*Maximum width for polishing in .010 – .030 thickness ranges is 5 in.

Facilities for processing alloy steels also are available.

Standard sizes normally available for prompt shipments.

Write for a copy of “Physical Property Charts” that give performance characteristics of .90 – 1.05% and .70 – .80% carbon grades.

Wallace Barnes Steel Division

Bristol, Connecticut

Associated Spring Corporation

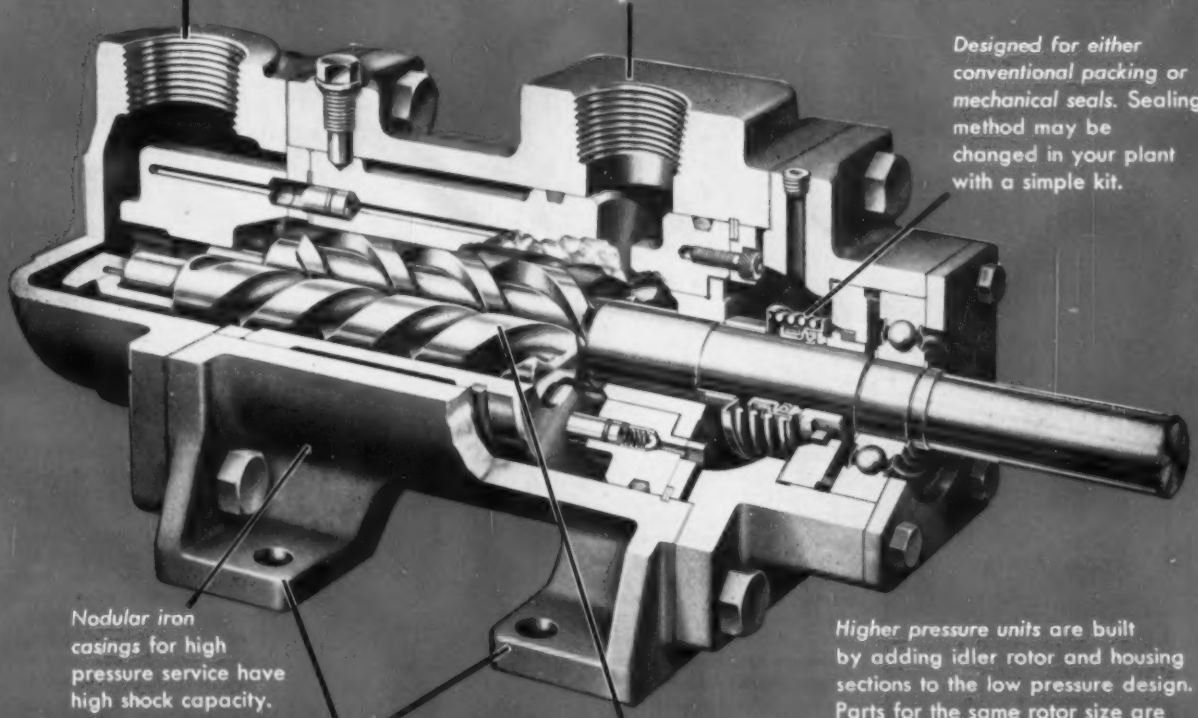
DE LAVAL
IMO PUMPS

are now more versatile than ever

De Laval IMO pumps have proved that they do a dependable job over long years of service. The reason is IMO design simplicity. These constant displacement rotary pumps have only three moving parts—smoothly intermeshing rotors that propel the fluid axially in a steady flow without churning, pocketing or pulsation. There are no timing gears, cams, valves, sliding vanes, or reciprocating parts to wear or become noisy. *Quiet*, compact IMO pumps are excellent for direct-connected, high-speed operation.

In addition to these basic pumping advantages, the improved IMO gives you important new benefits shown in the cutaway illustration below.

DE LAVAL IMO PUMPS can also be used as hydraulic motors.



Inlet can be rotated to suit installation arrangement.

Discharge flanges are infinitely varied. You can use the most advantageous piping method to suit installation requirements.

Designed for either conventional packing or mechanical seals. Sealing method may be changed in your plant with a simple kit.

Nodular iron casings for high pressure service have high shock capacity.

Any position mounting is possible without factory modification.

Higher pressure units are built by adding idler rotor and housing sections to the low pressure design. Parts for the same rotor size are interchangeable over the entire pressure range.

Internal parts are designed as a package so that units can be built into your machines.

Bulletin 3001 gives data on improved De Laval IMO pumps. Send for your copy today.

DE LAVAL *IMO Pumps*

DE LAVAL STEAM TURBINE COMPANY

899 Nottingham Way, Trenton 2, New Jersey

BL 418

Eye Protection

F9700 with Calobar lenses. Ideal for outside workers — maintenance yard men, vehicle drivers, R. R. transportation men, and personnel who need protection against glare, dust, wind, cinders, flying particles.

F9700* SERIES 2-TONE — Latest Ful-Vue Spectacle Type addition to a line combining the finest in safety values and smart good looks — another example of how AO's continuous research and engineering pays off. The attractiveness of these onyx on crystal acetate glasses is apparent but we cannot overemphasize that they are ***true safety standard*** in every respect — with safety hardened lenses and safety frames etc. Light, strong and durable, they protect against frontal foreign particle impact. Also ideal for chemical and physics lab work, electrical and other operations where sparks may cause fire or explosion. Comfort cable or spatula temples. The AO plaque on the frame means a true safety frame.

*FX9700 with adjustable nose pads

It's Smart to be Safe — and Safe to be Smart with

3 GREAT LINES OF AO "ULTRASCOPIC" SAFETY GLASSES

F5100 SERIES METAL — For frontal protection (and with side shields, front and lateral protection) on machine, hand tool and woodworking machine operations. Comfort cable temples for glasses with side shields, spatula or comfort cable types for glasses without side shields. Side shields are individually fitted adjustable, replaceable. Sizes clearly marked.

F9500 SERIES* ACETATE — For frontal protection against foreign particles on machine and hand tool operations and chemical and physics lab work. Also with side shields for front and side protection when chipping, grinding, riveting, bottling, spot welding etc. Available with copper bronze frame as **F9500CB**.

*FX9500 model with adjustable nose pads.

NOTE: All 3 lines are available with clear or Calobar lenses (the latter for protection against glare, heat, ultraviolet and infrared hazards as well as impact). All lines feature engineered eyewire design with a deep groove to hold lenses securely and safely on impact . . . and many other features.

YOUR NEAREST AO SAFETY PRODUCTS REPRESENTATIVE CAN SUPPLY YOU.

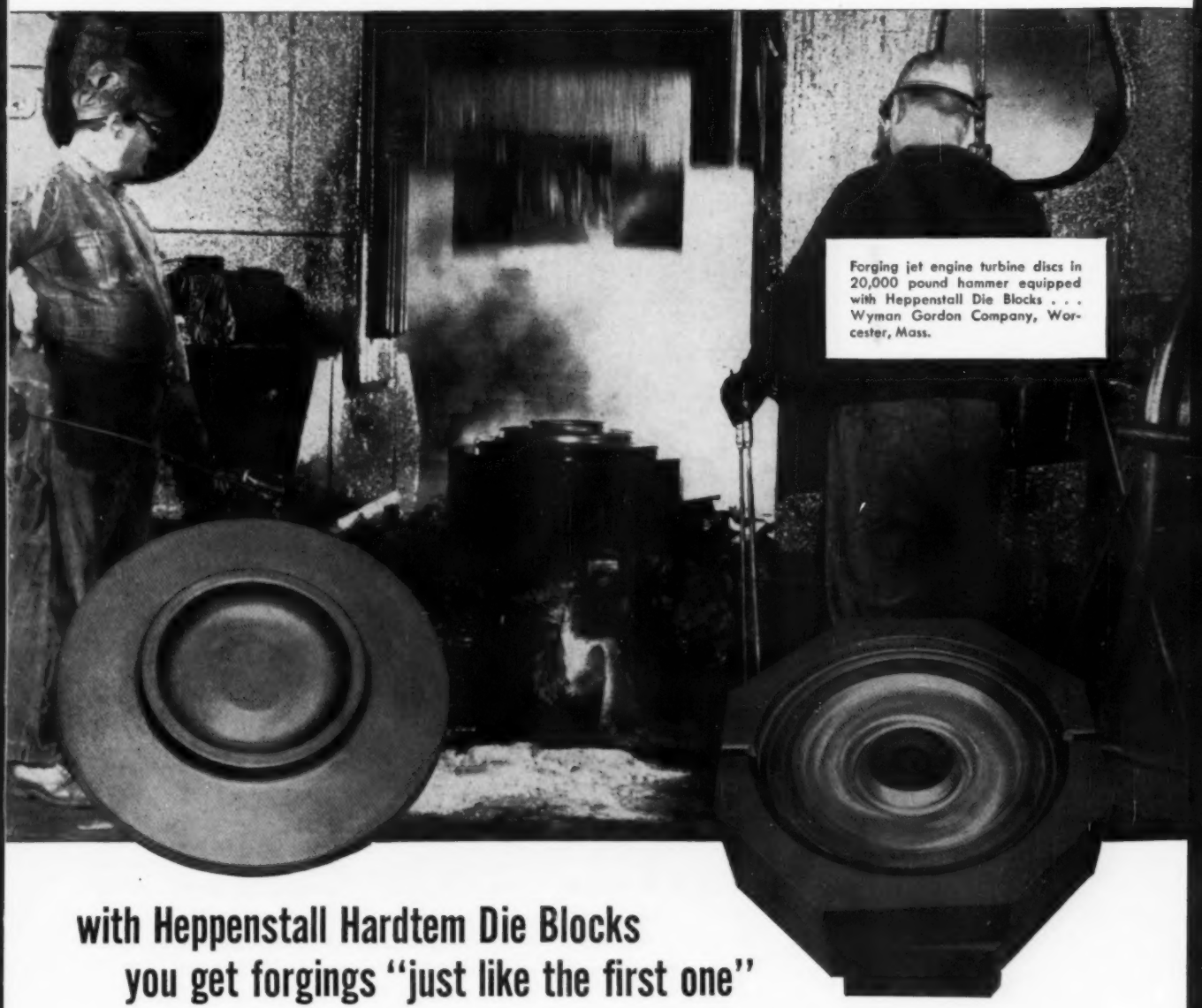
Always insist on the AO Trademark on lenses and frames

American Optical COMPANY
SAFETY PRODUCTS DIVISION

Southbridge, Massachusetts
Branches in Principal Cities

1833-1958 • 125 LEADERSHIP YEARS

Forgings that FLY must meet rigid tolerances



Forging jet engine turbine discs in 20,000 pound hammer equipped with Heppenstall Die Blocks . . . Wyman Gordon Company, Worcester, Mass.

with Heppenstall Hardtem Die Blocks you get forgings "just like the first one"

Tolerances are especially close for these jet engine turbine disc forgings. That's why they're forged in Heppenstall Hardtem Die Blocks. For this job, Wyman Gordon Company selected Hardtem "B" Blocks.

Holding dimensions for long runs is only one of the well known characteristics of Heppenstall Hardtem Die Blocks.

Machinability of Heppenstall Hardtem rates equally high with veteran die sinkers. When they lay out a design on Hardtem, they expect and *get* savings in cutting time, longer tool life, and a more accurate sinking.

Forged on all six faces from special Heppenstall Steel, Hardtem and other Heppenstall Die Steels are manufactured in a wide range of hardnesses to match varying customer requirements of application and machinability. If you're looking for better die block performance, contact your Heppenstall Representative.

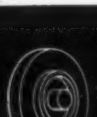
These five Heppenstall Warehouses carry stocks of the most popular size die blocks:

Bridgeport 5, Conn. • Detroit 32, Mich • Indianapolis 27, Ind. • Los Angeles 22, Calif. • Pittsburgh 1, Pa.

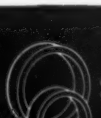
DIE BLOCKS

MATERIALS HANDLING EQUIPMENT

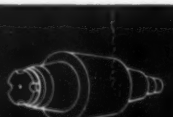
KNIVES



FORGINGS



RINGS



BACK-UP ROLL SLEEVES

HEPPENSTALL

. . . the most dependable name in die blocks

PITTSBURGH 1, PENNSYLVANIA

NOW CF&I WIRE . . .

clean . . . convenient . . . compact . . . cuts costs

This new, revolutionary method of packaging keeps CF&I Wire free of rust and dust from the last pass on the drawing frame, through shipping and storage, until the sealed fibre drum is opened at your wireforming machines.

Each 600-lb. capacity fibre drum holds from five to eighteen miles of CF&I wire in *one continuous length*. It provides these cost saving advantages: • **Increased production (fewer set-ups)** • **Wire will not snag or kink** • **Simplified storage (stack them)** • **Easier inventory control (count them)** • **Can be palletized for easy handling** • **Less scrap loss (no coil ends).**

Whatever your packaging requirements, or whatever your specifications for steel wire may be, check with CF&I. Our newly modernized and enlarged plants can provide fast delivery on high or low carbon steel wire . . . round, flat or shaped . . . in a wide variety of sizes, tempers, grades and finishes . . . in small quantities, carload or mixed carload lots.

WHEN YOU NEED WIRE . . . MAKE

IN FIBRE DRUMS

Here is a partial list of the many types of carbon steel wire manufactured by CF&I:

GRADES

low carbon
medium high carbon
high carbon
round
square
flat
shaped

FINISHES

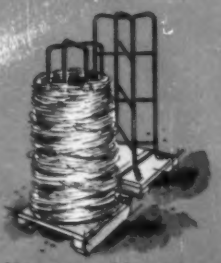
bright dry drawn or lime bright
bright grease drawn
cadmium coated
coppered
extra clean smooth bright
galvanized
liquor
white liquor
tinned

STANDARD TYPES (partial list)

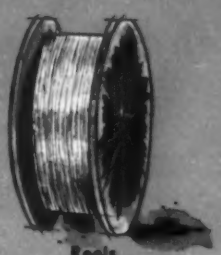
aircraft cord
bee
bobbin ring
bobby pin
bookbinder
broom
brush
casing
clip
concrete reinforcing
cotter pin
curtain spring
die spring
fine & weaving
fuse
Gamma spring
garment hanger
glass netting
hair pin
hat
hose, reinforcement
hose, mechanical
hose, vacuum
lock spring
lockwasher
manufacturers' drawn
mattress
merchant
nail
oil tempered
picker tooth
picture cord
pin ticket
regulator
rope
safety pin
screen
shaft, flexible
Signal Corps
snake fishing
spiral binding
spring
stapling
staple
stone
tie
twisted & laid
upholstery
valve spring
weaving
welding
Wissco Iron

Other CF&I standard packaging methods

Steel-strapped coils (200- 2000 lbs.)

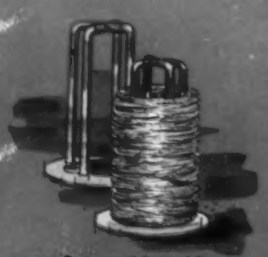


Non-returnable spiders (500-700 lbs. capacity)



Reels (500-800 lbs. capacity)

Steel-strapped wooden rack



Returnable spiders (2000-4000 lbs. capacity)

CF&I-WICKWIRE WIRE

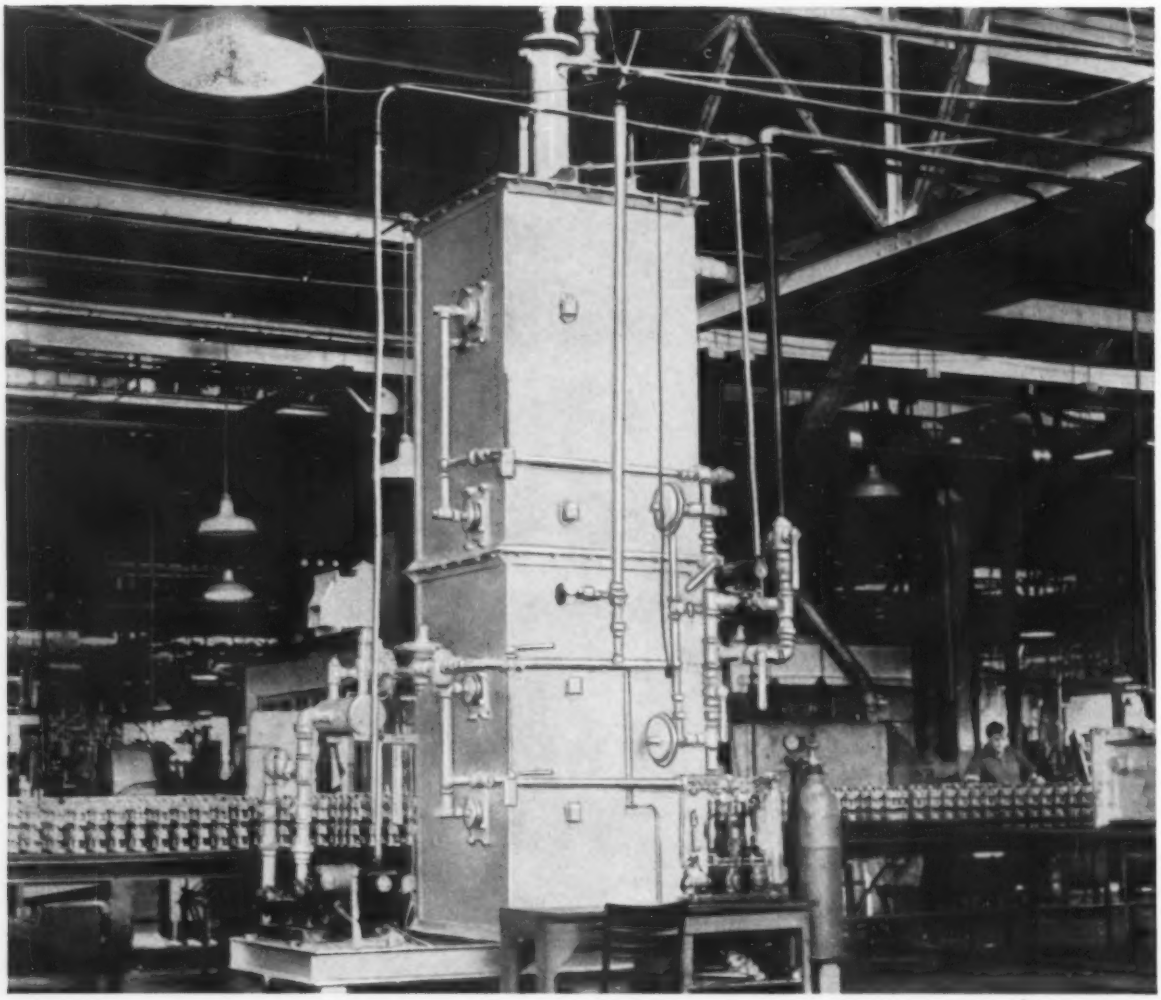
THE COLORADO FUEL & IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln • Oklahoma City • Phoenix • Pueblo Salt Lake City • Wichita • **PACIFIC COAST DIVISION**—Los Angeles • Oakland • Portland • San Francisco San Leandro • Seattle • Spokane • **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo Chicago • Detroit • New Orleans • New York • Philadelphia • **CF&I OFFICES IN CANADA:** Montreal Toronto • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg

5933

CF&I YOUR SOURCE OF SUPPLY

1,800,000 cfh
of RX generator atmosphere



That's the combined capacity of all the Surface RX® gas generators sold since this first one started operating April 4, 1941. This was the first practical catalytic gas generator for continuous bright gas carburizing . . . and it's still in use at Warner Gear Division, Borg-Warner Corp.

Such long-term reliability is only one of the reasons why so many plants standardize on Surface gas generators. Controllability, flexibility, turn-down operation, variety of gases and capacities are some of the other reasons. We'll be happy to tell you more about them.

Surface Combustion Corporation, 2373 Dorr St., Toledo, 1, Ohio. In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario.

Surface®

wherever heat is used in industry

Specify SANDVIK *Precision-Tailored* Spring Steel

FOR ACCURATE FLATNESS, STRAIGHTNESS, WIDTH, GAUGE AND EDGE FINISH *PLUS* SPECIFIC PHYSICAL PROPERTIES

SS-138

When you require specific physical properties combined with accurate dimensions in spring steel, call Sandvik.

From composition, through processing to the finished strip, Sandvik has had long experience in precision-control. That is why you find Sandvik steels used for feeler gauges, watch springs, compressor valves, camera shutters, reeds, shock absorbers and many other exacting spring steel applications.

Sandvik supplies cold rolled specialty strip steels –

- **In special analyses for specific applications.**
- **Precision-rolled thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered — scaleless or polished bright, yellow or blue.**
- **With square, round or dressed edges.**

Sandvik stocks a wide variety of qualities and sizes. In addition Sandvik has Rolling, Slitting, Edge-Filing and Hardening and Tempering facilities.

NEW, FREE BROCHURE

Gives Specific Data On Sandvik Cold Rolled and Hardened and Tempered Strip Steels. Catalogs leading types by application and lists finish, usual size range and chemistry. Send for your copy today.

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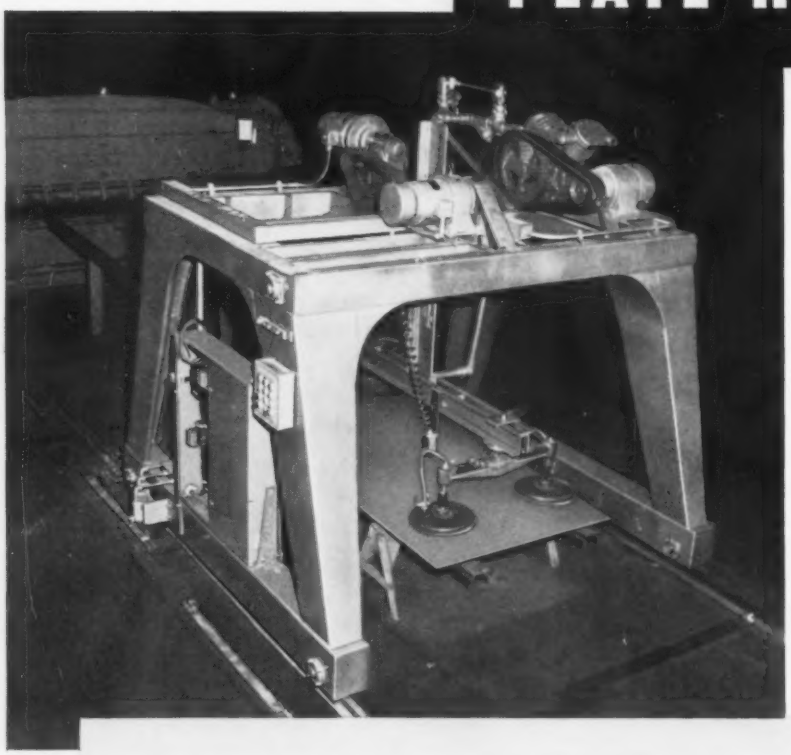
WORKS: Sandviken, Sweden

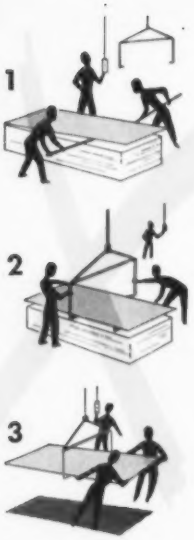
Sandvik Quality Steels

REPEAT ORDERS

–convincing evidence that it PAYS to use

NOBLE *Automatic* PLATE HANDLERS





Every firm which has purchased* a NOBLE automatic plate handler and has had the equipment in operation for more than three months has re-ordered. One is now installing the **eighth** unit!

This is mighty convincing proof that NOBLE equipment produces the expected increase in production at substantial cost reduction. It is also convincing evidence that NOBLE handlers are practical, reliable production equipment.

It will pay you to investigate NOBLE Automatic Handlers **now.** Available in standard capacities of 1,000, 2,000, 3,000 and 4,000 lbs., and in higher capacities and special designs to meet your requirements. Write or wire for details today; please address Dept. **I-6.**

*names on request

NO CREWS NEEDED to pry up plate, attach grabs, wrestle plate into position! At the touch of a button, your NOBLE handler picks up plate or sheet, raises and carries it, accurately positions and releases it on feed table, rolls, conveyor. Also re-stacks from machine, transfers from pile to conveyor, etc. Vacuum lift handles any type of flat material, without marring!

NOBLE COMPANY

P. O. Box 1979 • Oakland 4, California

TAKE A TIP FROM VICTOR

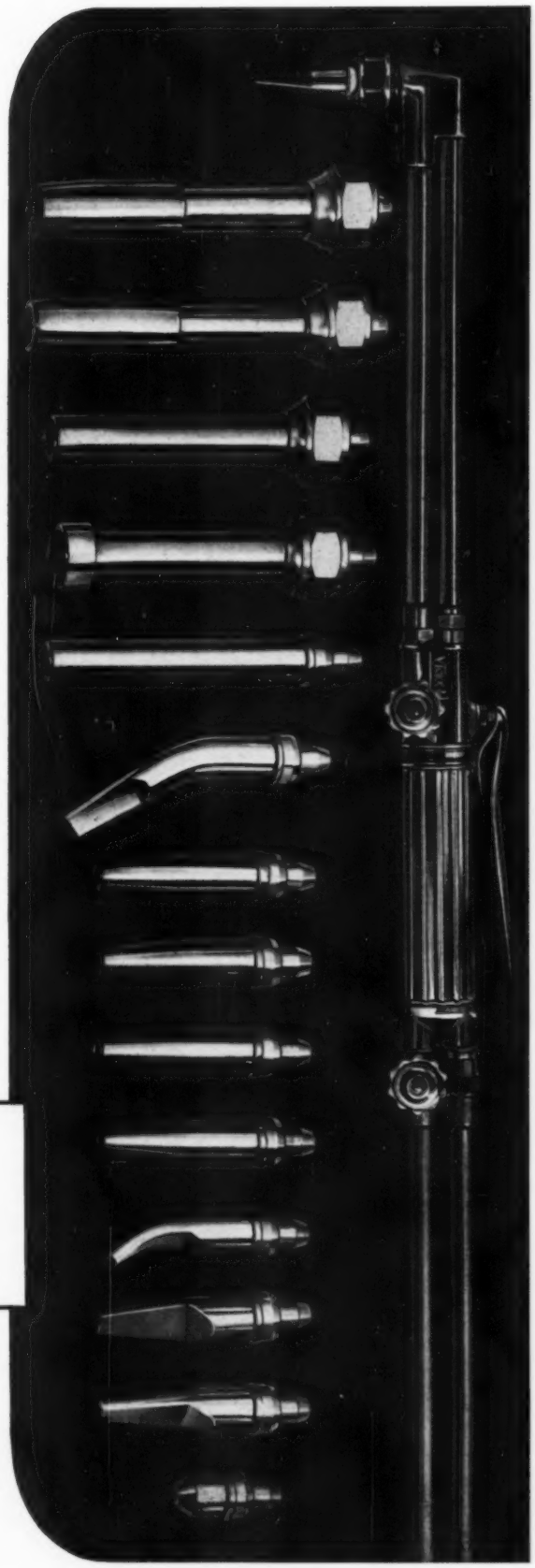
(You'll be glad you did)

SELECT FROM MORE THAN 35 TYPES, SIZES FROM 000 TO 16

No matter what your cutting needs — from light preheating to heavy underwater cutting — there's a right Victor tip for each job.

PRECISION MADE — Specially designed machines and time-proven methods, developed during Victor's 40 years of tip manufacture, assure you consistent, efficient performance from each tip. Carefully proportioned preheating and cutting orifices, accurately finished on polished mandrels, produce free-flowing gas jets which enable you to use lower, more economical gas pressures. Exactly machined tapered seats assure absolutely gas-tight fit in Victor Cutting Torches. Finally, each Victor cutting tip is flame tested to insure you perfect flame and cutting jet characteristics.

Why work with misfit or "bootleg" tips? Get the right Victor cutting tips for your jobs NOW from your Victor dealer.



WRITE FOR FREE TIP SHEET

VICTOR for welding

Pictures and describes complete line of Victor cutting tips, tells what Victor torches each fits. Just ask for Cutting Tips Bulletin 314.

43

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

844 Folsom St., San Francisco 7 • 3821 Santa Fe Ave., Los Angeles 58

Experience**—the extra alloy in **Allegheny Stainless

key words in solving production puzzles:

Allegheny for Stainless; Ryerson for Service

If one of your toughest production puzzles is getting top quality stainless steel *when* you need it, check in now with the Allegheny-Ryerson combination.

Allegheny Ludlum is the leading producer of stainless steels in all forms. And Ryerson, long recognized as the largest and best steel service center, carries Allegheny Stainless. This unbeatable team brings you the best quality stainless quick, when you need it.

Ryerson now stocks 2,351 shapes, sizes, finishes and alloys of Allegheny Stainless . . . the most complete line of stainless anywhere! And Ryerson relieves you of the inventory cost, gives you as quick service as your own stockroom.

Whether your order is for Allegheny Stainless sheet, plates, bars or whatever, Ryerson stocks it. Trained salesmen and technicians to help in selecting or in fabricating are at your service.

Call Ryerson, for top quality Allegheny Stainless from warehouse stocks. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

WSW 7124

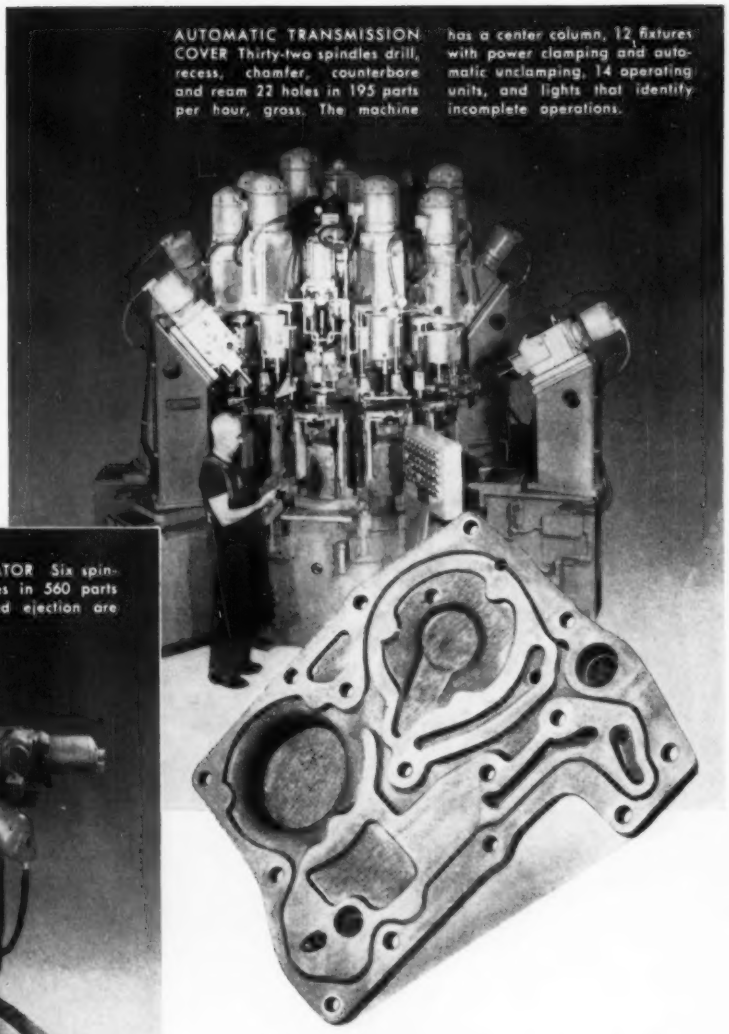
ALLEGHENY LUDLUM

for warehouse delivery of Allegheny Stainless, call RYERSON

Export distribution: AIRCO INTERNATIONAL

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

. . . whether your drilling and tapping jobs are SIMPLE or COMPLEX



AUTOMATIC TRANSMISSION COVER Thirty-two spindles drill, recess, chamfer, counterbore and ream 22 holes in 195 parts per hour, gross. The machine has a center column, 12 fixtures with power clamping and automatic unclamping, 14 operating units, and lights that identify incomplete operations.

COUNTERWEIGHT FOR REFRIGERATOR Six spindles spot, drill and tap two holes in 560 parts per hour, gross. Unclamping and ejection are automatic.

. . . YOU PRODUCE MORE GOOD PARTS, MONTH AFTER MONTH . . . ON A

KINGSBURY

One job is fairly simple, one complex, but both parts are produced at a high production rate with few rejects and little down time. Good basic design is the main reason. Each job had careful study so that the fixtures would hold the parts firmly and accurately and the tools operate as required.

Before we shipped these machines, we ran sample parts that gaged perfectly. When each customer received his machine it was ready to produce. Rugged construction will keep them producing month after month without trouble.

We've been building successful machines like these for 38 years. Ask us to quote one of your jobs. Kingsbury Machine Tool Corporation, Keene, N.H.

KINGSBURY INDEXING AUTOMATICS for high production drilling and tapping

WHERE DO NEW IDEAS COME FROM? . . .

ideas that stand the test of time spring from the minds of men with the courage to lead — to pioneer in thought — to try the untried.

It was an idea such as these . . . a revolutionary new product . . . that brought Wheelabrator Corporation into being fifty years ago. And the intervening years record a steady procession of other successful developments . . . *firsts* in their field.

This pioneering, inventive spirit has permeated the organization since the early days of its founding. It is the heart of Wheelabrator's business philosophy . . . the reason for its growth and leadership.

Preserving this proud tradition is a constant challenge and a never-ending responsibility of the entire Wheelabrator family of pioneers.

they come from **WHEELABRATOR**®

In airless blast cleaning, the *new* ideas of today come from the perfecter of the process itself—Wheelabrator Corporation. Since its invention twenty-five years ago, the Wheelabrator has opened up a vast world of uses in many fields. Its history is one of challenges met and needs fulfilled.

The Endless Belt Tumblast, the Continuous Tumblast, the Monorail Blast Cabinet, the Swing Table, the Multi-Table, Steel Abrasives, and dozens of other original blast cleaning ideas resulted from Wheelabrator's pioneering leadership.

Wheelabrator also developed the first machines and methods for utilizing the airless blast process for deflashing plastics; shot peening; reconditioning auto parts, steel drums, oil and gas pipeline; descaling sheet and strip, slabs and billets, structural shapes, wire rod and bar stock; finishing mill rolls . . . and a long list of similar developments to help industry do a faster, better job at less cost.

Sensing problems . . . finding practical ways to solve them . . . pursuing the policy of progress through creative engineering . . . that is why the new ideas in blast cleaning come from Wheelabrator. And a good policy it is . . . for the next fifty years, too.

WHEELABRATOR corporation

510 S. Byrkit Street Mishawaka, Indiana

Canadian Offices: Scarborough (Toronto) Montreal

World's largest manufacturers of airless blast equipment and steel abrasives.

HERE'S SELF-ALIGNMENT

in a steel housing

"MILL BEARINGS" have super-rugged cast steel housings. Caps are anchored by extra-large dowels and four heat-treated thru-bolts with serrated steel nuts. "Mill-Bearings" are effectively sealed, self-contained, factory adjusted —need no shims or alignment rings at installation.

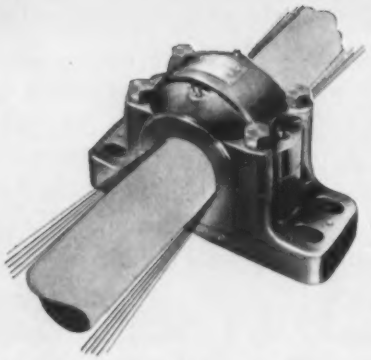
LINK-BELT "Mill Bearings" compensate for shaft deflections in extra-severe applications

With cast steel housings plus *self-alignment*, Link-Belt "Mill Bearings" are a perfect match for the grind and grime of heavy loads in steel mills, mines, foundries and similar grueling service. They instantly adjust to shaft misalignment . . . accommodate minor inaccuracies of welded and concrete support structures . . . end need for extra-heavy shafting to avoid deflections which ruin ordinary bearings.

Link-Belt "Mill Bearings" are part of industry's most complete line of self-aligning ball and roller bearing blocks. You can get full information from any of 40 Link-Belt offices or your authorized stock-carrying distributor.

LINK-BELT

MANUFACTURERS OF SELF-ALIGNING BALL AND ROLLER BEARINGS



Spherical bearing is free to align in any direction, assuring full load capacity regardless of shaft deflection.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14,906

Lima Type 44 Magnetic Crane, equipped with 50-ft. boom, loading scrap in yard at Liberty Scrap Materials Co., Inc., Cincinnati, Ohio.

The first LIMA sold the second at Liberty Scrap Materials Co., Inc.

"My first Lima was a used Type 34," reports Isadore Liebowitz, owner of Liberty Scrap Materials Co., Inc., Cincinnati, Ohio, "and it produced so well and cost so little to maintain that it sold me on the new Lima Type 44.

"It is loading two carloads a day per eight-hour shift, and if we had the material, we could easily handle three carloads in the same amount of time.

"The excellent service rendered by our local Lima distributor was another major factor in our decision to buy a Lima. It's a great thing to have service always available when you need it. When I am in the market for another crane, you can bet it will be a Lima."

Mounted on rubber for maximum mobility, Limas are available in capacities up to 70 tons, and will go anywhere a truck will go at speeds up to 38 mph. If mobility is not a big factor in your operation, you can get crawler-mounted Lima cranes with capacities up to 110 tons. And readily interchangeable front end attachments—magnet, shovel, dragline and pullshovel—give Limas the utmost versatility.

Get the complete Lima story from your nearby distributor or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA Construction Equipment Division, Lima, Ohio

BALDWIN · LIMA · HAMILTON

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

BALDWIN BLH LIMA-HAMILTON

5815

NEW
Heavy-Duty Torque Converter Trackmobile
• switches, spots 'n' hauls freight cars at lowest cost
• pulls 4 loaded cars from a standing start
MWR 1344
The Ball Line

5TM Trackmobile

MOVES MORE CARS–QUICKER, EASIER!

Here's robust power to switch, spot and haul freight cars. Energetic *new* 5TM Trackmobile quick-changes from road wheels to rail wheels and back again to put cars where they're needed—when needed. Built for day in, day out punishment, 5TM never says quit. Its hefty torque converter and engine mean muscle control at its smoothest — *gliding* strength to pull a string of loaded freight cars.

Production never lags when industry's toughest convertible is on the move and *moving*. And just like Models 3TM and 2TM "three moves a day make it pay." Ask for your copy of the new 5TM Trackmobile Bulletin now. *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.*

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

WHITING

TRACKMOBILE

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILE; FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

Saves Time... Cuts Costs

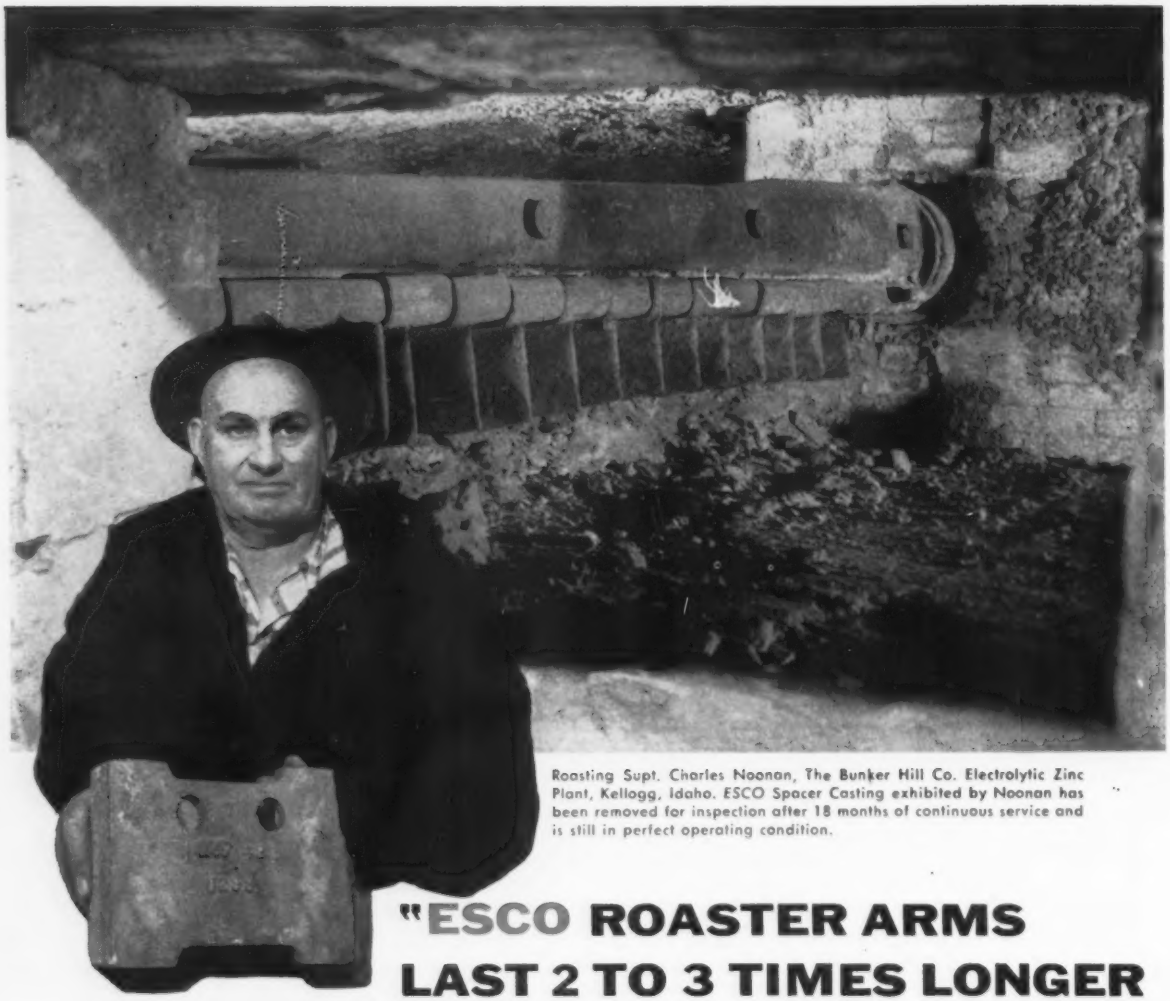
Rotary Planer • • • do milling jobs in one-third to one-seventh of time on an Espen-Lucas Rotary Planer.

Big Sawing • • • production cutting of large stock —rapid, easy, straight-to-a-line piece after piece—on Espen-Lucas Cold Sawing Machines.

The **ESPEN-LUCAS** *Machine Works*

Front Street and Girard Ave., Phila. 23, Pa.

BUILDERS OF LARGE COLD SAWING MACHINES • ROTARY PLANERS • COLUMN FACERS • HEAVY TYPES OF SPECIAL MACHINERY



Roasting Supt. Charles Noonan, The Bunker Hill Co. Electrolytic Zinc Plant, Kellogg, Idaho. ESCO Spacer Casting exhibited by Noonan has been removed for inspection after 18 months of continuous service and is still in perfect operating condition.

"ESCO ROASTER ARMS LAST 2 TO 3 TIMES LONGER

and saved us $12,000 in original cost"

"Since we started using *ESCO* Roaster Arms, two and one-half years ago, we have gotten more than two full year's service from most of them and 90 per cent of them are still going strong," explains Roasting Superintendent Noonan, Bunker Hill Co.

"Operating conditions here are among the most severe to be found anywhere," Noonan continues, "but the high heat and heavy concentration of sulphur dioxide gas in the roasters just doesn't seem to hurt the *ESCO* parts nearly as much as the previous ones." And *ESCO* Roaster Arms can be successfully welded in the event of damage.

ESCO Roaster Arms are "job-tailored" to individual operating conditions for longer life and lower operating costs. For help with all your problems of corrosion, heat and abrasion, call or write an *ESCO* engineer today.

ESCO®

ELECTRIC STEEL FOUNDRY COMPANY

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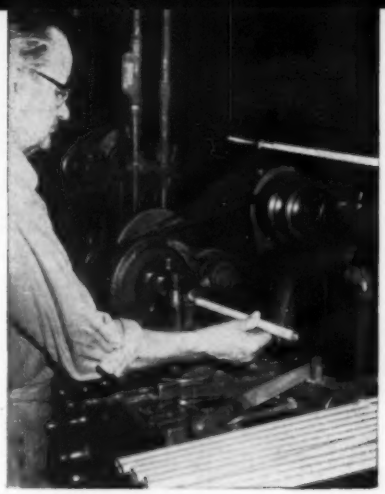
MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL

Offices in Most Principal Cities

ESCO INTERNATIONAL, NEW YORK, N. Y

IN CANADA ESCO LIMITED



Operator at Day-Brite plant is lathe-cutting fixture stems fabricated from Youngstown Cold-Rolled Sheets.

Accent on excellence

Youngstown hot and cold-rolled sheets

Students attending the new, modern Concord City School at Concord, North Carolina, will benefit by the latest developments in Day-Brite higher-intensity school lighting. All areas of the classroom will afford the greatest possible visual comfort—without any annoying reflected glare.

These beautiful, scientifically-designed fixtures, manufactured by Day-Brite Lighting, Inc., of St. Louis, Missouri, are fabricated from Youngstown Hot and Cold-Rolled Steel Sheets. Close quality-control by Youngstown guarantees Day-Brite a sheet of unwavering uniformity that makes possible long, trouble-free production runs—boosts profits, cuts over-all costs.

Wherever steel becomes a part of things *you* make, the high standards of Youngstown *quality*, the personal touch in Youngstown *service* will help you create products with an "accent on excellence".

QUALITY YOUNGSTOWN SERVICE

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel
Youngstown, Ohio

HOW TO MAKE YOUR $'S DEGREASE MORE PARTS

You make no profit on the time you spend cleaning out a degreaser.

You cut another slice off the top of profits whenever you have to add fresh stabilizer to your trichlorethylene bath.

When a bath goes "sour" while you're processing, you lose still more time and money.

psp is the simple answer

Trichlor is trichlor the world over; it's the *stabilizer* in your trichlor that can make the difference.

The difference in Nialk® stabilizer is *psp*—permanent staying power.

Nialk stabilizer is neutral. It cannot react with acids to form corrosive salts. Still it "accepts" acids and renders them completely harmless. The Nialk stabilizer will not stain or discolor your parts or allow your bath to become "sour."

You never add fresh stabilizer to a Nialk bath. The stabilizer stays potent no matter how long you use it. It's insoluble in water so you don't lose it during steam distillation or in the water separator of your degreaser.

Nialk frees your bath of those degradation products which settle on coils and cut down heat transfer. Cleanouts are widely spaced and quickly finished.

If your profit picture could use a little brightening, you'll want to know more about the whole subject of trichlor stabilizers. Send for our Bulletin 70 for the complete story.

HOOKER ELECTROCHEMICAL COMPANY
306 Union Street, Niagara Falls, N. Y.

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DUREZ® PLASTICS DIVISION • NORTH TONAWANDA, N. Y.
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AMBALLOY... A. M. BYERS ELECTRIC FURNACE QUALITY STEEL PRODUCTS

TIMETABLED DELIVERY... SERVICED BY SPECIALISTS

Quality carbon, alloy and stainless steels with the best service in the industry are our guarantee to each customer. We start with a quality product—AMBALLOY steels—then follow up with a firm delivery date that gets your order where you want it, when you want it, fast.

But the Byers service policy extends beyond delivery. High grade production facilities are an important part of our program. We also offer a personalized technical service through our highly trained corps of metallurgists.

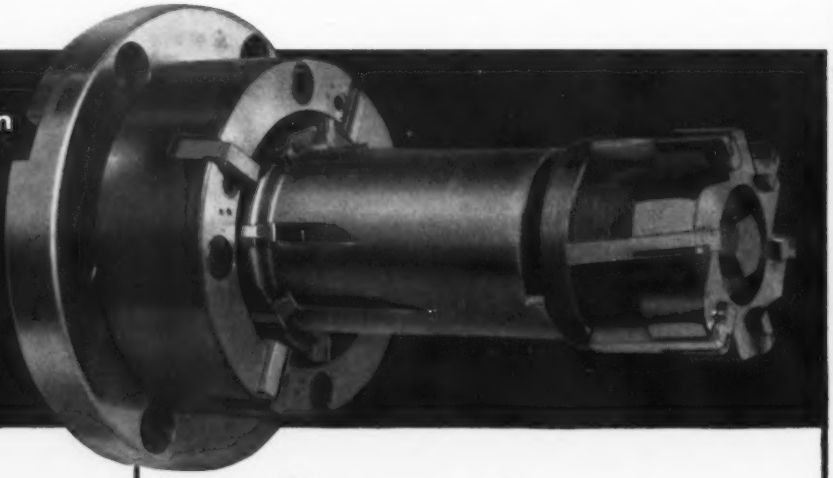
Ninety-three years of producing ferrous metals have familiarized us with many of your problems. So check Byers first for your steel requirements. Write for new catalog. A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

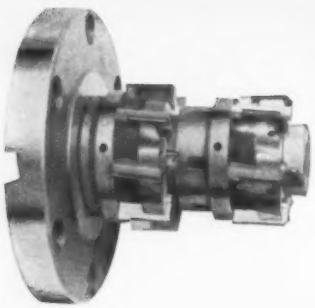
A growth company with the emphasis on quality and service **A. M. BYERS COMPANY**

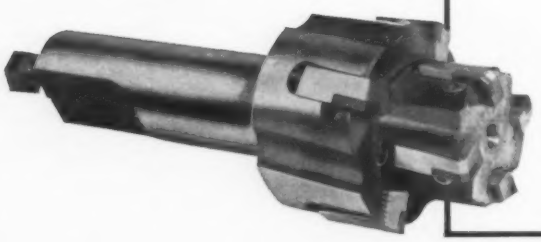
for high-production,
transfer-type machining...

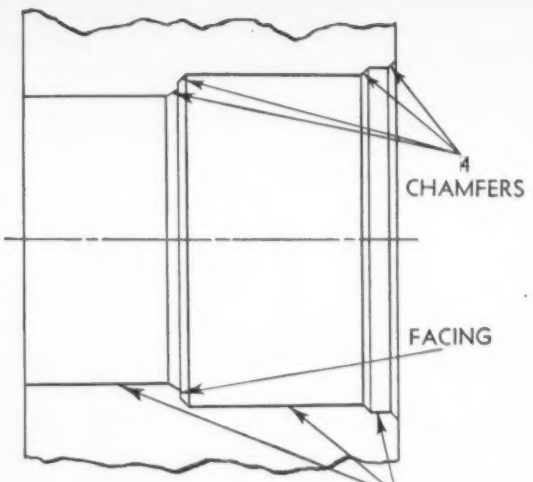
Barber-Colman

MULT-O TOOLS SAVE TOOLING COSTS!

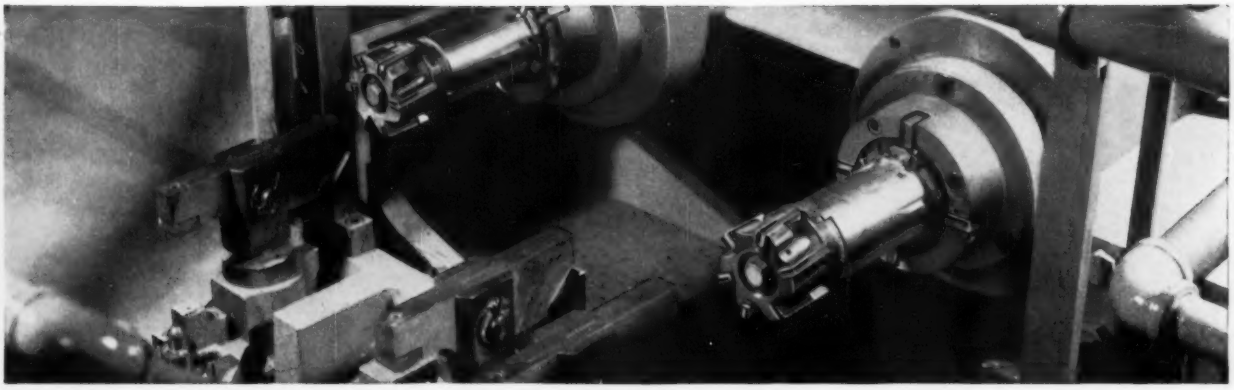








Eight surfaces cut by one MULT-O Tool



These Barber-Colman Mult-O Tools perform 34 machining operations on power steering housings which are processed on a 35-station Greenlee transfer machine. A total of nineteen tools ranging from .220" to 6.250" diameter combine multiple operations for facing, hollow milling, boring, reaming and chamfering.

In most cases, one tool performs several operations. The sample drawing shows the eight surfaces which are cut by one tool. There are four chamfering operations, one facing operation, and the tool reams three different diameters. All tools are designed to perform a maximum number of operations. This combination of operations results in a minimum number of spindles.

Most cutting edges are carbide tipped inserted blades. Carbide tips provide long tool life, and the inserted blades result in low tool cost since only the blades require replacement. Wherever possible, standard blades are used so that they can be obtained from stock. Conventional sharpening methods are used on all tools.

In designing high-production Mult-O Tools of this type, Barber-Colman Engineers consider chip load, finish required, and amount of stock to be removed for determining the number of blades in each tool. Holding means and type of blade mounting are designed to suit each particular application and size of tool.

On this job, machine designers supplied part prints, sequence of operations and production requirements. With this data, Barber-Colman Cutter Engineers designed tools to combine multiple operations for the most efficient results.

Mult-O Tools can also offer cost saving advantages for *your* production operations. If you use multiple operation, transfer-type machining in production, ask Barber-Colman Engineers for analysis and recommendations on cutting tools which produce maximum efficiency. Send part prints and production desired. A representative will be glad to discuss your requirements on request.

BARBER-COLMAN COMPANY

846 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines

BARBER COLMAN

Tubexperience in action

Special mill services through your Superior Tube distributor

* You may be faced with the need for tubing services that only highly competent specialists at the mill can provide. You may need small tubing in hard-to-get analyses. Or of special shapes, held to very close tolerances. Or with a closely controlled range of properties. Perhaps it must also undergo rigid inspections and tests not normally available from tubing suppliers.

Requirements like these call for a tubing specialist.

CONTACT A SUPERIOR TUBE DISTRIBUTOR

His broad experience can help you solve many problems. But most important of all—he can acquaint you in detail with many special services offered by the mill. These include statistical quality control, nondestructive tubing inspection and testing, pilot and test lot sampling and melting, field specialist and specification services—there are many more.

EQUIPPED TO SERVE YOU

You will find that your Superior distributor has a modern steel service center equipped to meet all your requirements in tubing. He offers you:

- Small tubing in many analyses
- Wide range of sizes
- Tubing of highest quality for any applications
- Diversified stock
- Prompt price quotations and delivery
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For more information about Superior tubing, write for a free copy of Bulletin 40, "A Guide to the Selection and Application of Superior Tubing." Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

Now SIMONDS Offers You

a Fine Grained, Silicon Killed

LOW CARBON

Flat Ground Steel

This new line is in ADDITION to

SIMONDS FLAT GROUND DIE STEEL

High Grade Alloy Tool Steel

(Oil Hardening — Air Hardening)

Here's a fine-grained, forging quality, silicon-killed steel that opens up the way to important savings on items like jigs, fixtures, patterns, stripper plates, punch pads, die plates, die-blocking shims . . . *and parts that don't require heat treatment or in some instances, just case-hardening.*

This new line of low-cost, LOW-CARBON Flat Ground Steel rounds out the present Simonds line of Oil Hardening and Air Hardening Die Steel. What's more, it has equally fine finish . . . and is made to the same close tolerances, with excellent welding quality and machineability.

Simonds LOW-CARBON Flat Ground Steel is furnished in a wide range of flats from 1/16" to 1½" thick and ½" to 16" wide, and in squares from ⅜" to 2⅞". All sizes come in standard, ready-to-use 24" lengths, individually packaged. Stock sizes are ready now . . . special sizes on order. *Get full details from your Simonds Distributor today.*

TYPICAL CHEMICAL ANALYSIS

C. .18	Mn. .50
Si. .20	Phos. & Sul. .04

Heat Treatment By Case Hardening Only

SIMONDS SAW AND STEEL CO.

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Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y. Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

For Fast Service from Complete Stocks

Call your **SIMONDS DISTRIBUTOR**

No Excessive Heating

New Rectifier Cooling System Prevents Heat Build-up and Damage

when ac Power Fails

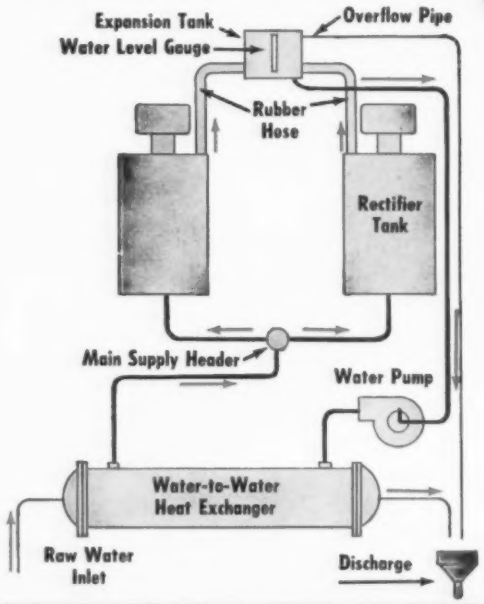
A SAFER, more effective cooling system in the Allis-Chalmers rectifier continues to circulate water *even when an ac power failure stops the water pump.* Heat and steam are dissipated before they can develop to the danger point.

The new system features an expansion tank that extends the full length of the rectifier frame with short vertical connections from each tube. With warm water continuing to flow freely upward, a thermo-siphoning action draws cooler water into the tubes. Build-up of excessive temperatures is prevented. Steam pockets are kept from forming. Subsequent water loss from the recirculating cooling system is minimized.

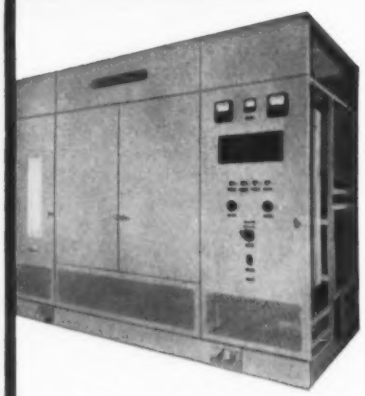
Successful operation in hundreds of installations is your assurance of the complete reliability of Allis-Chalmers mercury arc rectifiers. Contact your nearby A-C office or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

How the System Works

Water is normally pumped through the water-to-water heat exchanger to the main supply header from where it circulates through rectifier tubes picking up heat. Hot water flows up through the short connections to expansion tank and back down to suction side of water pump.



ALLIS-CHALMERS
Mercury Arc Rectifiers



Factory-packaged units cut installation time and costs. Sealed tube rectifiers are supplied in completely enclosed or open types. Here is a typical, completely enclosed, 1000-kw, 250-volt rectifier for steel mill service.

ALLIS-CHALMERS

A-5425

More Oxygen for Steel

Look for oxygen to be applied in Bessemer converters on a production basis in this country. There have been production applications abroad, but only test activity in this country. Now one mill is ready to go ahead with regular oxygen enrichment of Bessemers.

Small Firms to Get Info

Small firms are going to get help from the government in turning research into profits. The Business and Defense Services Administration is simplifying descriptions of government research results. BDSA plans to set aside an extra $50,000 for a special program of adapting scientific and technical information for small firms.

High-Temperature Fan

A ceramic fan, designed for high-temperature exposures in industrial furnaces, is already past the development stage and is on a field test program. A companion piece, that should attract attention when introduced, is a ceramic roller designed to lick the heat-erosion problem in roller-hearth industrial furnaces or in connection with traveling grates.

Worry About Teamsters?

Both unions and companies are worried about the reported agreement between the Teamsters and Office Employees International Union. The Teamsters are to support the organizing of office workers by OEIU. Other unions feel this may hamper their own organization efforts and no one is anxious to see a spread in the power of the Teamsters.

Storm Sewer Water Supply

One company has found a unique way to solve its water supply problem. The firm's water costs were soaring because it was not located near a river or stream. City filtered water has to be brought for cooling and processing. Looking for other water sources, the company found a storm sewer on its own property. The city is expected to grant permission to the firm for tapping this line that carries off surface and subsurface drainage.

Army Ups Plane Spending

Army's spending for new planes is on the rise. In the current fiscal year purchases will total $121 million for 887 units. In the coming fiscal year, the Army wants funds to buy 656 costing $156 million. Helicopters account for about 60 pct of purchases. By the end of next fiscal year the Army plans for 7600 pilots for an equal number of planes in inventory.

Variable-Speed Unit

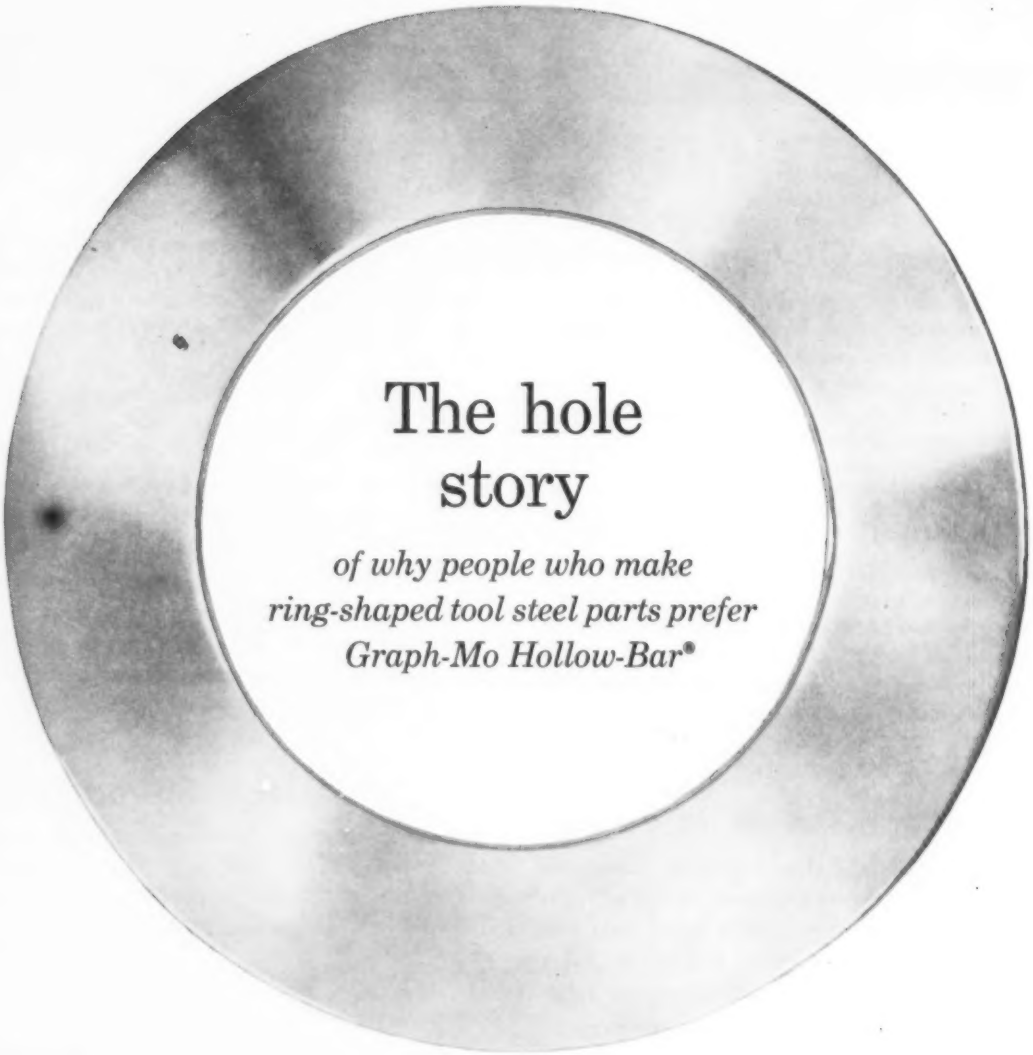
A mechanical variable-speed transmission is to be suitable for both high and fractional horsepower. Based on a new concept, the unit is positive in action and insensitive to torque fluctuations. It features stepless speed control from unit's maximum value to zero.

Controls for Arc Welding

Two arc welding machines, operated by numerical controls are about to go into use. One, a spot welder, will be used for jet engine production. The other, designed for automotive applications, will join long members forming box frame sections.

Shock Waves Harden Metal

A new tool in metal research uses explosive shock waves to harden metals. Laboratory produced pressures of almost 9 million psi cause structural changes in brass, copper and iron, as observed by X-ray diffraction and microscopy. The shock waves leave behind a hardness greater than that produced by cold rolling to 95-pct reduction, yet without change in dimension. The studies also show promise as a means for measuring blast strengths.



The hole story

of why people who make ring-shaped tool steel parts prefer Graph-Mo Hollow-Bar®

Eliminate drilling and you cut the cost of making ring-shaped tool steel parts. That's a big reason why more and more tool makers are switching to Graph-Mo Hollow-Bar®. The hole is already there. By starting with finish boring you save manufacturing steps and machining time.

But that's just half the story because Graph-Mo also machines faster, wears longer and gives more stability than ordinary tool steels.

Graph-Mo machines faster because of the free graphite in its structure. There's far less tendency to pick up, scuff and gall. And users report Graph-Mo averages three times longer wear than other tool steels. The reason is the combination of free graphite and diamond-hard carbides in the Graph-Mo structure. As for stability, a master plug gauge machined from Graph-Mo was examined after 12 years of use. Dimensional change was less than 10 millionths of an inch!

Do what other tool makers are doing. Specify Graph-Mo Hollow-Bar for *all* your ring-shaped parts. You'll save time, money, and have a better finished product. Choose from 3 to 16-inch O.D., many wall thicknesses. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* **STEEL**

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

How Workers Help Management Compete for New Business

Recession has made workers conscious of importance of cost and efficiency in competing for scarce new business.

In Ohio cross section of metalworking plants, workers are pitching in to help out. Unions cooperate.—By T. M. Rohan.

■ Metalworking labor and management didn't know how well they could get along together until the recession hit.

In plants all over the country, workers are taking a new interest in the welfare of their plants and pitching in to help pull the company through its tough times.

Cost-Conscious Workers—Some of the results noted in a survey of Ohio metalworking plants, a typical cross section of metalworking, are less scrap, higher productivity, fewer grievances, less waste, better tool care, and many other by-products of a newly cost-conscious work force.

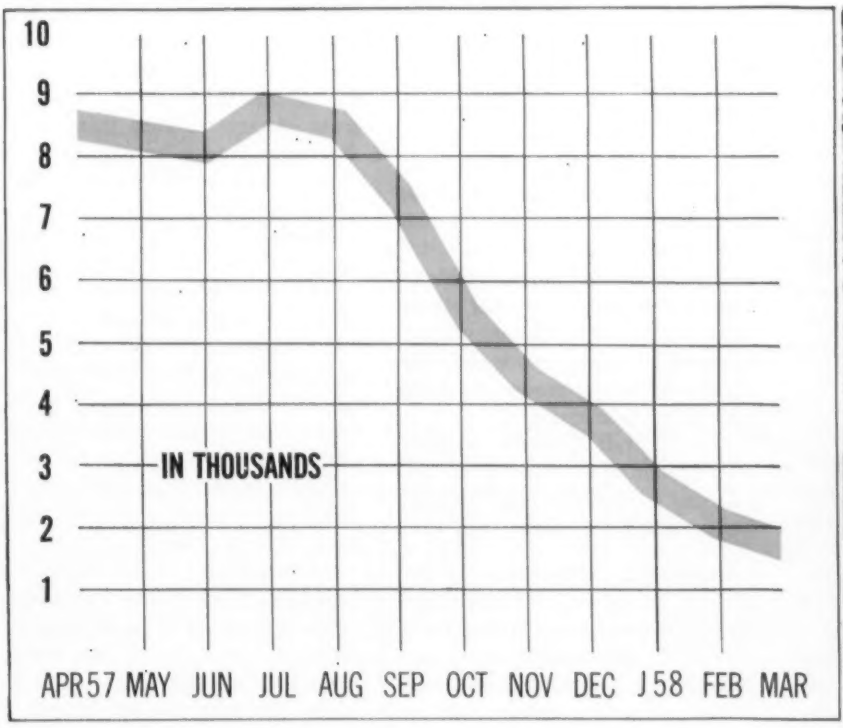
At McKay Machine Co., Youngstown, O., workers are told when a job has been bid extra low to keep the shop working and it's up to them to hustle enough to pull the company through.

Works Both Ways — "We'll go half way on this many times and haven't lost out yet," says L. J. Goist, shop superintendent. "The men know it's up to them to carry the ball. If we lose out on these jobs the men know there will be that much less work for the shop."

Productivity per man hour is up and scrapped jobs are down, for one reason because the work force

Jobs Get Tight—Workers Pitch In

Openings for Skilled Workers Fall Off*



*Listings at U. S. Public Employment Offices

now is old timers with at least 6 years service. Companies which have maintained good labor relations over the years are now reaping the benefits when they need them the most.

Results Show — Among northeast Ohio Metalworking plants generally, grievances have dropped to nothing. Hardly anybody is quitting their jobs. Quality of output is up in many cases because the more careful, high seniority old timers not on piecework have time to do their best work. Scrapped jobs are fewer. And workers are helping to cut down waste by taking better care of tools and machines and using up supplies like gloves, towels and small parts more carefully.

Although management is firmly in the saddle in local labor negotiations this year, it isn't digging in its spurs. Where wage increases have been made in Cleveland this year so far, they have averaged about 7 cents per hour. But in the majority of cases, new contracts are holding the line on wages for the first time in years.

Fringes Hold Up — "About as far as most companies around here have gone in getting back some of the fringe benefits is to get some coffee breaks cut down or shortened, wash times tightened up and similar wasted time cut down," says Ray F. Vacha, director of industrial relations for Associated Industries, Cleveland. Mr. Vacha has negotiated about 30 area contracts covering well over 100 companies in northeast Ohio this year so far.

"There have been no reductions in life insurance, paid holidays, vacations, welfare funds or other fringes which at last count cost about 49 cents per man hour in this area," Mr. Vacha says. "We are finding that among smaller companies, quality of workmanship is way up.

"For the first time in years, employees can take the time to use all the craftsmanship they know how. High seniority, experienced workers make up the bulk of the work force now. Scrapped jobs are rare. Employees are far more careful than normal because they can take the time, and also because a high scrap rate works against their record."

Stewards Cooperate — Another cooperative move is that union stewards are more likely to agree to hold grievance conferences during off-duty hours even though the contract reads it's on company time. This is so workers won't be sent home for lack of supervision because the last foreman is negotiating.

An outstanding case of labor-management working together is at Thompson Products in Cleveland. Thompson in January launched a "60 Minute Man" program to get employees at all levels to do more in the first and last half hour of their working day which are generally the slowest periods. In letters to employees, wasting a single minute was likened to throwing four or five cents on the floor.

It Works—Success of the plan was indicated by Vice President Stanley C. Pace, who reported that despite the overall decline in the jet engine market, Thompson Products has been able to increase its percentage of the available business. An important factor in making this possible was cost gains achieved through the 60 Minute Man program, he said.

Ray Livingstone, vice president-human relations, said that there have been "measurable and gratifying results in achieving our objective of holding on to present business and getting new business."

The Aircraft Workers Alliance at the plant were briefed on the plan and supported it fully. Thomas Burke, AWA president, said:

Workers Want Business—"AWA officers and stewards, like all other employees, want to see more business in the plant, the business decline bottomed out, and as many laid-off employees called back as possible. Therefore anything that's fair, reasonable and that does not violate employee rights under the contract, we will support."

"We haven't had anybody quit here because they didn't like it in over eight months," says A. C. McDaniel, Jr., secretary of Hill Acme Co., Cleveland machine builder. "We are holding the costs down a little through a drive started four months ago to stop wasting wiping cloths, towels and other supplies. We ask that they don't drop drills on the floor, don't abuse machines and generally do a little better housekeeping.

"Severe quality control standards have also dropped the scrap rate to the vanishing point. Our productivity has stayed about the same because we have put in close quality control while in previous years standards were not as closely watched."

Scrap at Minimum — "Workers are mighty careful of their jobs these days," says John Molner, shop superintendent at National Acme Co., Cleveland. "Even where they must go to another climate for family health reasons, they now ask for extended leaves while they look around. Before they just quit.

"Since our workers are on the incentive system, the biggest problem is to keep enough work in front of them to keep them busy. Our scrap rate is continuing at a very low rate and little more reduction is possible."

Warner & Swasey in Cleveland clamped the lid on lost time practices in 1949 and took a strike to get it. Its last grievance was in 1955. Average wage rate for straight time is now about $2.57 per hour compared to about $2.15 in New England for machine tool builders there. Higher worker productivity and company capital investment is credited with the firm being able to compete.

At Yoder Co., Cleveland, fringe benefits are negotiated with the union on strictly a dollar figure. When the amount is set the union can take the fringe in any form it wants. Workers are on incentive system.

Job Stretching Watched — The new sweetness between labor and management is most evident in shops making larger capital goods like machine tools, heavy processing machinery and other types with high labor factor.

A major hurdle, though, is the natural tendency of workers to "stretch" the jobs to make them last and avoid layoffs. Stretched jobs eventually make firms noncompetitive so the foreman's big job these days is to watch for it and keep work scheduled smoothly.

In high production, repetitive manufacturing like fastener firms, stamping firms, small motors, and assembly operations, piecework or incentive rates automatically take care of productivity. "We don't care how long they take for washups at all," one plant manager said. "The men are paid for what they do, not for their time."

New Clauses in Contracts — Negotiations for new contracts are also going into some long neglected areas.

Seniority clauses have been unchanged for years while the emphasis was on fringe and wages and security rights have not been clearly defined in many cases.

Some men with a decade or more of service have been laid off for lack of a single day's seniority. Yet Associated Industries recently pointed out in many cases seniority is not defined as occupational, plant-wide or departmental. It does not cover probationary periods, vacations, sick leave, layoffs, etc. And its weight compared to skill and ability is controversial in deciding who shall be laid off with least impairment to shop operation. It also becomes involved in length of vacations, choice of shifts, promotion and transfer.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

PUNCHED OUT: Automatic press squeezes out nuclear fuel pellets.

Atomic Fuel Made In Filter-Tip Size

▪ Nuclear fuel pellets—each about the size of the filter tip on a cigarette —are being made from uranium powder at the Westinghouse Electric Corp. metals plant at Blairsville, Pa.

Fabricated in the form of small cylinders, these pellets, when arranged in proper pattern and quantity, form a fuel which will generate and sustain the nuclear fission process in atomic reactors.

European Service—The pellets in production at the Blairsville plant will go overseas for use in a 11,500-kilowatt atomic plant which Westinghouse is building for Belgium. Later several other nuclear steam generators being designed by the Westinghouse atomic power department will also use this fuel.

Although the uranium oxide powder presents some handling problems, R. D. Rowley, manager of the plant, says the pellet method of manufacturing fuel elements has cost advantages.

Mix, Dry, and Press—First step in producing the fuel pellets requires mixing a slurry composed of uranium oxide and organic binders. The mixture is then blended in a king-size electric mixer.

After the slurry has been dried and the powder prepared it is fed into a special automatic press which compacts or "squeezes" the powder into "preforms" which do not crumble easily. Pellets are then sintered to remove all organic material and strengthen the bonding force within the pellet.

Sintering is followed by grinding to final dimensions and a rigid check for quality control specifications. Each pellet must meet tolerances of less than one-thousandth of an inch.

More Aluminum for Packaging

Producers Say Vast Potential Is Still Untapped

▪ Aluminum producers continue to press their suit on the lush $4 billion per year packaging industry.

They say the courtship to date has produced some remarkable results, and predict even better things to come.

Predicted—Total aluminum used in packaging will probably reach 230,000 tons annually by 1965, predicts P. C. Althen, manager of packaging sales development, Aluminum Co. of America.

Foil packaging is poised for another major upturn after doubling in volume from 1952 to 1956, reports Paul Murphy, vice president, Reynolds Metals. And, he points out, 100 billion packages a year already use aluminum in some form.

Selling Points — Producers are stressing eye appeal, product protection and customer convenience in their packaging push. They say there is little doubt aluminum packaging helps move goods off the shelf. Product protection, always a strong sales point, will get more attention in the future. Reynolds is readying release of new tests on food preservation in aluminum.

For customer convenience, heat-and-serve products are being taken one step further. Single-portion containers have been developed to double as cooking vessels. Alcoa predicts aluminum packages will eventually be plugged into an electric outlet for cooking.

Brightest hopes for aluminum include cans, cartons, single-service and cook-in pouches, foil-plastic coffee packages, bread wraps, fluid milk cartons and frozen citrus juice containers.

Cost Comparison—Cost disadvantage compared to competitive materials is being narrowed. Reynolds says it has developed a Mylar-foil-polyethylene package for vacuum packing coffee which is cheaper than the conventional tinplate can.

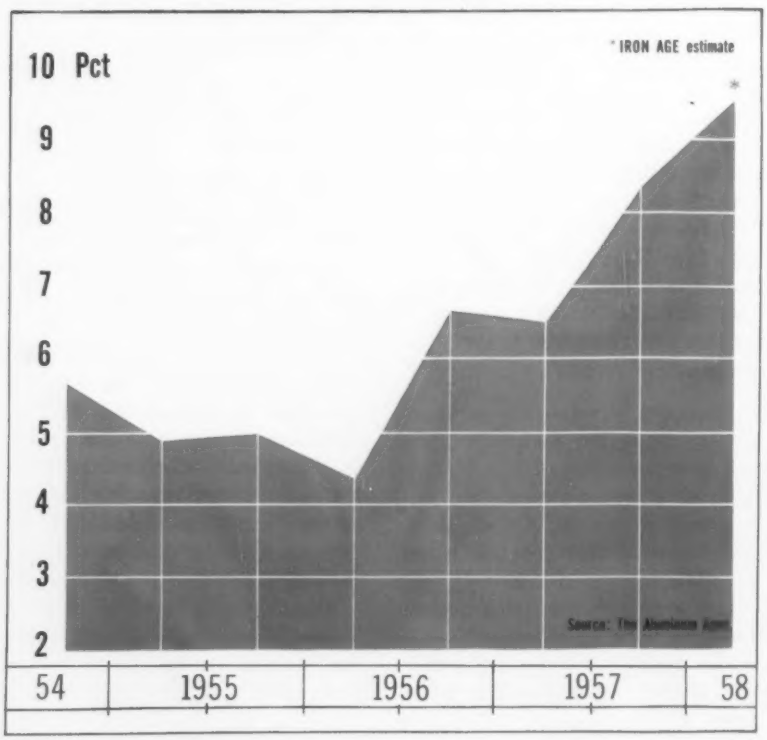
Frozen citrus juice concentrates are a hot market with annual sales of 1.5 billion cans. Reynolds believes it can use 0.007-in. aluminum for these containers. This, the company claims, would make aluminum cheaper than tinplate. But there are still problems: Conventional machinery is not geared to handle material so light.

Good Possibilities — Other applications are shaping up: A leading detergent is being market tested in a foil carton. Fluid milk cartons, either all foil or with a foil liner, may solve the leakage problem for the dairy industry. And more of the 2.5 billion loaves of bread sold annually are being wrapped in foil. Reynolds expects a hefty return on its $45 million investment in carton-making facilities.

Interest remains high in the controversial aluminum can. Reynolds, first in the field, is saying little about future plans. But there are rumors it will announce a major development in a few weeks.

Packaging Takes a Bigger Share Of Aluminum Shipments

Pct of wrought shipments for containers and packaging



Can Work — Alcoa believes aluminum cans have "promising potentials"; expects in 15 to 20 years this use will take as much aluminum as passenger cars do today. But the company is working on a foil-and-paperboard model they hope will displace both tinplate and aluminum oil cans. Alcoa also sees good potential for this combination for food packaging.

Rigid foil containers continue to find wide use, especially for food. Growth has been spectacular, from 1 million lb in 1952 to 28 million lb in 1957. Alcoa believes it has a major advance in its new smooth-wall rigid container, which permits the tight hermetic seal important to food packers.

Overall, aluminum producers believe their packaging future is as bright as their product. They point out the six years since 1952 have been the industry's longest uninterrupted period to push foil use for packaging. The results so far—foil was one of the few aluminum products which boosted '57 shipments over '56 — make the industry confident of great things ahead.

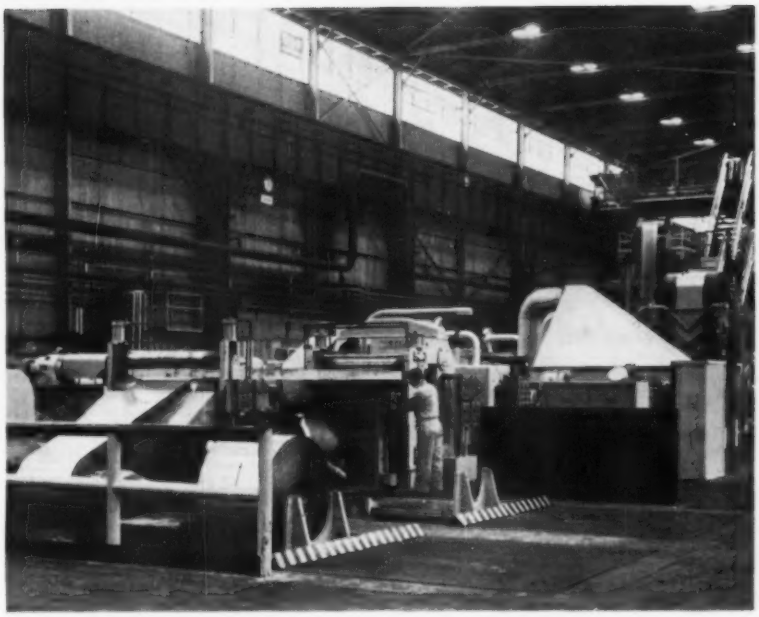
Bill to Aid Railroads

Things may look up for the distressed railroad industry.

Government aid, stressing new equipment loans and tax benefits, is the purpose of a rail-help bill in the Senate. Ratemaking changes, authority to drop unprofitable services and facilities, and some limitation on competitors are also part of the assistance package.

Chance of Change—The Senate Commerce Committee has approved the bill, S. 3778, for floor action. Though the measure may be amended on the upper-house floor, prospects are good for endorsement of most of the present contents.

House treatment of the aid bill may be somewhat more severe. Chairman Harris (D., Ark.), of the House Commerce Committee views the Senate bill as too broad for general approval.



EITHER COATING: This galvanizing line at U. S. Steel's Irvin Works is being converted to coat steel with either aluminum or zinc.

U. S. Steel to Make Aluminized Sheet

■ U. S. Steel Corp. is getting ready to enter the aluminum coated steel sheet market, currently dominated by Armco Steel Corp.

The Corporation expects to get into production in late 1959. A 48-in. light gage continuous hot dip galvanizing line at its Irvin Works near Dravosburg, Pa., is being modified to handle both aluminum coated and galvanized sheets. The switch from one to the other can be made in two to three hours.

Cut Into Galvanized—U. S. Steel says its aluminum coated steel sheets will go after many markets now using galvanized. It expects aluminum will "cut into galzanized markets fairly heavily."

Richard F. Sentner, U. S. Steel executive vice president—commercial, says that aluminum coated steel sheets "will combine the inherent strength of carbon steel with aluminum's resistance to atmospheric corrosion, good heat reflectivity and heat resistance. Aluminum as a steel coating has high temperature advantages over zinc."

Comparative Cost — On price, galvanized has the advantage. U. S. Steel is not ready to talk about comparative cost factors.

Indications are production costs are similar. But primary aluminum costs about twice as much as primary zinc. Price outlook for both is hazy.

Armco points out that aluminized steel's main advantage over galvanized is longer service life and less maintenance.

Available—Initially, the Corporation will make aluminum coated steel only in sheets 18 gage and lighter. And it will make one, all-purpose type.

Steel's Capital Spending Plans

(Figures in Millions)	1958	1957	1956	Remarks
U. S. Steel Ingot capacity	$565.0* 40.2	$514.9 39.6	$311.8 39.2	This year's spending will be down from 1957 but above average of past 3 years.
Bethlehem Steel Ingot capacity	$159.0* 23.0	$208.9 20.5	$211.6 20.0	
Republic Steel Ingot capacity	 12.2	$149.7 11.0	$106.8 10.2	$200-million program mostly completed.
Jones & Laughlin Ingot capacity	$58.0 7.5	$100.7 6.9	$113.2 6.2	Completing 3-year $272-million program in middle of '58.
Youngstown S. & T. Ingot capacity	$56.8* 6.5	$78.6 6.2	$70.4 5.7	
National Steel Ingot capacity	$33.0* 6.8	$85.5 6.2	$108.8 6.0	$500-million program begun in 1952 due for completion in early '58.
Armco Steel Ingot capacity	$65.0 6.3	$82.9 5.9	$66.1 5.1	
Inland Steel Ingot capacity	$100 5.8	$130.5 5.5	$65.7 5.2	$286-million 3-year program winds up this year. 75 pct of '58 spending for basic steel.
Wheeling Steel Ingot capacity	$21.0 2.4	$130.5 2.2	$65.7 2.1	Completing 3-year program this year.
Sharon Steel Ingot capacity	$5.2 1.98	$11.2 1.9	$9.3 1.8	Annual spending averaged $10-million in past 3 years; ⅓ to basic steel This year ½ to steel.
Kaiser Steel Ingot capacity	$100.8** 1.5	$162.3** 1.5	 1.5	$214 million program started in 1956 due for completion this year.
Detroit Steel Ingot capacity	$3.2** 1.5	$14.9** 1.5	 1.3	2 years
Crucible Steel Ingot capacity	$6-$8 1.4	$16.2 1.4	$11.9 1.4	
Pittsburgh Steel Ingot capacity	$11.0** 1.4	$24.3** 1.32	$13.2 1.32	Company has spent $105-million since 1950. Completion of openhearth program will increase capacity to 1.56 this year.
Granite City Ingot capacity	$7.0 1.2	$15.9 1.2	$18.5 1.08	3-year $33-million program will end this year. Steel capacity will be 1.584 million some time in 1959.
Allegheny Ludlum Ingot capacity	$8.0 0.864,200	$16.0 0.864,200	$16.0 0.864,200	$130 million spent since war. No more ingot cap. planned.
Barium Steel Ingot capacity	$53.0** 0.930,000	$6.0** 0.846,000	 0.893,000	800,000 ton steel plant to be first step in 2-million ton mill.
***Northwestern Steel & Wire Ingot capacity	 0.825,000	$9.3 0.825,000	$4.4 0.825,000	
Alan Wood Ingot capacity	$3.5 0.800,000	$7.6 0.800,000	$7.6 0.800,000	$3.5 million going to direct reduction plant this year. 10-yr. spending has been $56.7 million.
Lukens Steel Ingot capacity	$30.0** 0.750,000	$5.80** 0.750,000	 0.750,000	25 pct of new spending is for added ingots.

* Amount required to complete projects authorized or underway 12/31/57. ** 2 year period.
*** Fiscal years ending July 31.

IRON AGE survey confirms that post-war boom has run out of steam.

Steel men feel '59 will be a "breather" year to be followed by four more years of modest outlays.—By G. J. McManus.

▪ Has the big post-war steel expansion boom run out of steam? It looked that way this week on the basis of an IRON AGE survey of leading steel firms.

The prevailing sentiment of steel men is that a pause may be in order following the intensive modernization and expansion spending of the last several years—spending that boosted industry capacity from 99.4 million ingot tons in 1950 to 140.7 million tons this year.

'59 a Breather — Some look at 1959 as a "breather" year to be followed by another 4 years of expansion slowdown. But over the long term the mills are talking confidently of the need for further expansion. Spending this year will approximate $1 billion, but '59 is a question mark.

In fact the mills are saying nothing about their 1959 spending plans and very little about '58. Of the biggest producers, only U. S. Steel has indicated it will spend more than its 1956-57 average.

The Market Factor — A good part of the 1958 spending is a carryover from programs started last year or earlier. A large part of spending will run out in the first part of the year as these programs are wound up.

Even without the market drop, there probably would have been some tapering off. Republic Steel has about wound up a $200 mil-

lion program. Jones & Laughlin is completing a three-year $270 million program. National Steel has a $500 million program that was due to end this year. Inland Steel is polishing off a three-year $286 million expansion and modernization.

George M. Humphrey, chairman of National Steel Corp., reflects the thinking of many steel men on the immediate future:

"It's obvious the steel industry has excess capacity for the immediate future."

$10 Billion Since '47 — At the same time, he warns that the industry should not stand pat for any prolonged period. He says there should always be some margin of capacity above normal demand. Steel, he adds, should never limit the overall growth of the economy.

Last year's $1.75 billion represented a record outlay for expansion and modernization in steel. The second best year was in 1956 when $1.299 billion was spent, just a hair more than the $1.298 billion outlay of 1956. This year's spending will be comparable to outlays of $1.051 billion in 1951.

Since 1947, the industry has spent a total of approximately $10.0 billion, not including funds earmarked for this year.

Amend Scrap Bill

A Federal law suspending import duty on most types of metal scrap may be tightened up this year.

Senate Finance Committee has successfully inserted an amendment in the regular suspension extension bill providing nonferrous metal in pig, ingot, or billet form commercially usable without further processing would not be included in the suspension.

The amended version passed the Senate, and was returned to the House for its approval.

Lead, zinc and copper scrap are not included in the measure. It applies principally to iron and steel, aluminum, magnesium, and nickel scrap.

Some Small Tax Cuts Are Still Possible

Although major tax revisions are out, there is still possibility of some tax cuts.

Most likely are cuts in excises and a small business tax package.—By N. R. Regeimbal.

▪ Buried deep in the maze of current congressional tax cut politics is a strong possibility that there will be scattered tax cuts this year. They will amount to about $1 billion a year in some lower excises and in special help for small firms.

But there will be no big tax reduction. The corporation tax rate is to remain at 52 pct for another year. Personal income tax rates, too, will remain unchanged.

Door Not Closed—Recent agreements between the Republican Administration and the Democratic congressional leadership to bar any big tax cut program this year did not, despite first impressions, close the door on selected reductions.

Most likely outcome after the smoke clears away in a week or two are these cuts:

A cut of three percentage points in the present 10 pct excise tax on automobiles; elimination of the 3 pct excise on freight shipments and possibly the 10 pct excise on passenger travel; a small business tax package including fast depreciation on used equipment and easier inheritance tax rules.

Congressional Timetable — The chances are against any major revision in the depreciation laws generally, either as a temporary anti-recession move or as a long-range overhaul of present outmoded write-off regulations.

Timetable for tax cuts will run something like this: The House Ways and Means Committee, after clearing a simple measure extending the present 52 pct corporation and excise tax rates, will draft the small business bill. Both measures probably will go through the House unchanged, because House leaders plan to protect the tax bill against any amendments.

In the Senate, there will be determined efforts to force various tax cutting schemes into the bills. Most will fail, but there's a good chance that as a compromise, the auto and transportation excise cuts will be accepted. The small business bill should go through then unchanged.

In Effect by July—Bulk of the tax cuts voted will take effect July 1, and the rest for the calendar year beginning next Jan. 1.

The whopping promises of tax cuts made by eager politicians last fall and winter have been abandoned largely for fiscal reasons. This year's expected budget surplus will now be a recession-bred deficit of about $3 billion. Next year, costs of government will rise with little improvement in tax collections, and a shortage of $8 to $10 billion is forecast.

The Federal till couldn't stand another $8 or $10 billion revenue loss. The limited cut expected in small business would cost $140 million; the cut in auto excises some $350 million; and the freight and transportation repeal some $720 million a year.

South American Pact

General Electric Co. will supply the complete electrical system for a new steel rolling mill near Rio de Janiero.

The $2 million contract is with Brazilian National Steel Co. GE expects to deliver the equipment in eight months. About 12 to 13 months is considered normal.

Fleet Leasing Gains Momentum

Automakers Urge Dealers to Hop on the Bandwagon

More companies are going in for leased vehicles rather than buying their own or paying employees mileage allowance.

One of leasing's main attractions is the freeing of capital for other uses.

▪ Many applicants for sales or service jobs these days ask the question: "What kind of car do you furnish me?"

Ten years ago that question might have ended the interview. Today, a growing number of companies have an answer: "A leased car will be at your disposal."

Since 1948, the number of leased cars on the road has grown from 60,000 to about 360,000—a 500 pct gain.

Dollar Savings — The table on this page shows an important part of the story—comparative cost of salesman ownership versus leasing. With the average car in the survey clocking 24,780 miles a year, savings per unit range from about $737 down to $237 a year over a 10¢ and 8¢ per mile allowance respectively.

Average mileage allowance paid salesmen today is 8.9¢, resulting in a saving through leasing of almost $500 per year on each unit the company has on the road. The higher the allowance or the mileage, the greater saving leasing plans have to offer.

Frees Capital—While an average saving of $500 a year is no small bounty, companies like Westinghouse, U. S. Steel, and Republic Steel find even more important savings through leasing. It beats operating a company-owned fleet of cars.

Probably the most important advantage is the liberation of capital. Leasing frees money tied up in vehicles for direct use in the business of the company at full earning power.

A small tool and die shop, for example, had two salesmen's cars on its books as well as two executive cars and a pickup truck. When it switched to leasing, these fixed assets were converted into $15,000 cash. The company estimates that this money invested in equipment will return about 18 pct a year.

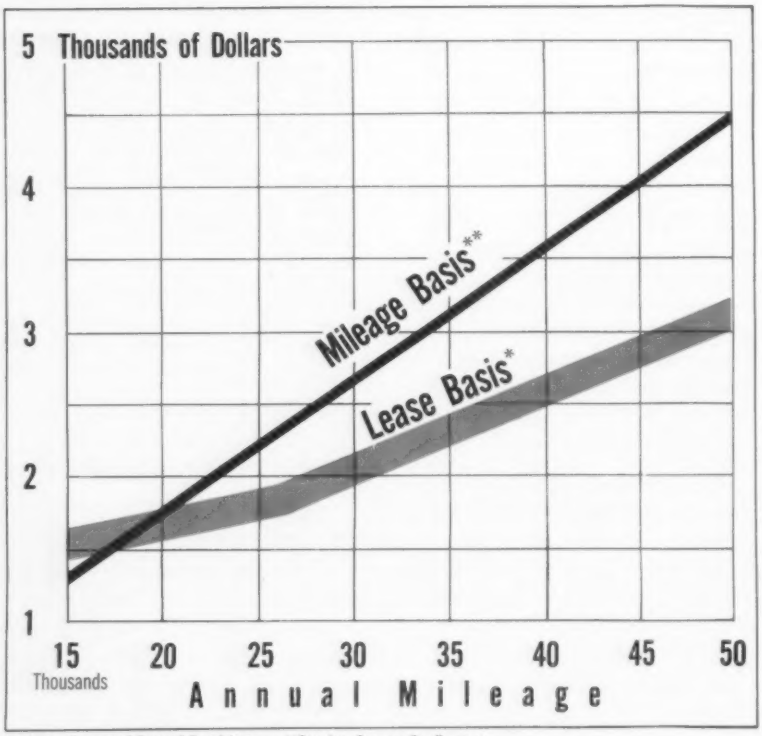
Dealers Try Out—Another important point for leased versus company-owned fleets are savings in accounting time and cost, plus elimination of need for maintenance facilities and personnel.

The number of companies in the renting and leasing field has grown almost in proportion to the number of units on the road. Latest to enter the field are individual automobile dealers. One group of dealers joined together to form CARS Rental System, Inc. With headquarters in Fort Lauderdale, Fla., the system has 300 franchised members in North America.

Automakers for It—Now it's reported automobile producers themselves are urging their dealers to enter the leasing field and will sup-

Car Leasing Versus Salesman Ownership*

Annual Cost of $2800 Car



*Includes oil, gas and 2-year full maintenance. **Based on 9c per mile allowance.

ply them with information to get started.

In fact, one Detroit automaker forecasts that by 1965, about two million cars will be leased annually. For many dealers, "leasing will prove more important than present new car retailing," the company predicts.

Leases to Suit—Several types of leases are available for both cars and trucks. Most popular is the full-maintenance lease which eliminates unpredictable maintenance expense and assures the lessee of 365 days of uninterrupted driving.

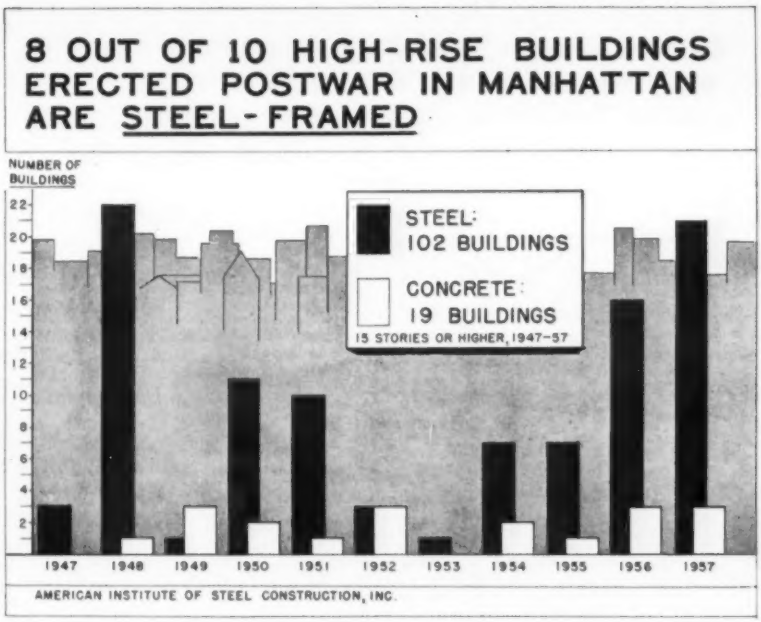
Such leases are usually drawn for a 12 to 60 month lease period. They cover the cost of tires, batteries and all other maintenance expenses. A full-maintenance lease does not include operating costs. The lessee pays for his own gasoline, oil, and other direct operating expenses.

Higher Cost — The full-maintenance lease has the effect of making transportation expense virtually a fixed cost item. Like insurance, it protects the company against the possibility of heavy maintenance expense. And like insurance, it costs money—an average of $17 to $20 a month more than the net lease.

The net lease, usually drawn over a period of 12 to 14 months, offers the lessee transportation at the lowest fixed monthly cost. The vehicle is supplied to him but the lessee must furnish all service and maintenance

All the Trimmings—A third type of lease, the special full-maintenance lease, covers all operating and maintenance expenses. The lessee provides only the drivers. Normally with this type of lease, the vehicles are returned by the drivers to the lessor's garage every night. The drivers pick up the vehicles the following morning, fully gassed and serviced.

While these are the three main types of leases, each agreement is a specially drawn document where the lessee may select features ranging from simply use of the vehicle to the complete maintenance-service package.


8 OUT OF 10 HIGH-RISE BUILDINGS ERECTED POSTWAR IN MANHATTAN ARE STEEL-FRAMED
NUMBER OF BUILDINGS
STEEL: 102 BUILDINGS
CONCRETE: 19 BUILDINGS
15 STORIES OR HIGHER, 1947-57
1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957
AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.

Construction Gains

■ An improved construction outlook is one of the factors that is giving metalworking some seasonal encouragement.

Last week the F. W. Dodge Corp. reported a "highly encouraging" increase in construction contracts in April. The increase was the first break in a series of declines which began last November, with practically all categories showing improvement.

Structurals Improve — One apparent result is a similar pickup in bookings of new orders for fabricated structural steel. The 6 pct pickup over March brought bookings to a total of 208,161 tons, a new high for the year, but still 48 pct behind a year ago.

The Dodge figures indicated that contracts for non-residential building in April totaled $957,796,000, up 14 pct from the year-ago level. It was also the first percentage increase of the year in this category.

The American Institute of Steel Construction also released a special study of the growing importance of steel in metropolitan construction. Over 80 pct of the multi-story buildings erected in Manhattan since 1947 are steel framed, the Institute says. (See chart)

New Developments Help — All the buildings combined used a total of 319,000 tons of steel. Among recent developments in the structural steel fabricating industry are high strength bolts, improved welding techniques that have expanded the variety of structural shapes, and lightweight construction methods.

In the easing steel market, structural steel is now available everywhere for fast delivery in any quantity, the Institute reports.

In overall building, the sharpest non-residential increases were in public buildings, up 83 pct, and hospital buildings, up 53 pct. Contracts for manufacturing buildings were down 16 pct in April, but this is a much smaller decline than the 46 pct drop reported for the full first quarter,

U. S. Steel Moves in Canada

Corporation asks bids on projects to further Quebec iron ore project.

It's part of firm's chain of global iron ore developments.—By Tom Campbell.

■ U. S. Steel's big iron ore development in North Central Quebec, Canada—known to have been in the making for several years—has now been officially tagged by the company. Bids are being received for a 193-mile railroad (see map) and a 6000 hp hydro-electric plant to be built near the mine site.

Docks, townsite, and concentrating plant bids will be received soon. Most engineering and construction firms have been aware of the project for the past two years at least (Iron Age, Nov. 9, 1956, p. 75). Lou Perrini, big time U. S. contractor and now an important personage in Canada, recently completed a 200-mile access road started in mid-1957.

Behind the Move—When completed U. S. Steel's mine will produce about eight million tons of iron ore concentrate a year from low grade easily beneficiated ore running about 30 pct Fe in its natural state. Concentrated product will run about 62 pct Fe or more. This ore will supplement U. S. Steel's Venezuela open pit high grade ore, its dwindling Mesabi ore reserves and its taconite project in the United States. Altogether U. S. Steel (always a lone wolf on large ore developments for its own use) will have taken care of its ore needs for the next 100 years.

Some sources profess to see U. S. Steel's Canadian project as a hedge against political trouble in Venezuela where it has a 12-to-15-million ton a year operation. But the Canadian project was planned by U. S. Steel people long before the recent revolution in Venezuela. The latter played but a small part in the overall decision to build in Canada even though it was considered when the final step was taken.

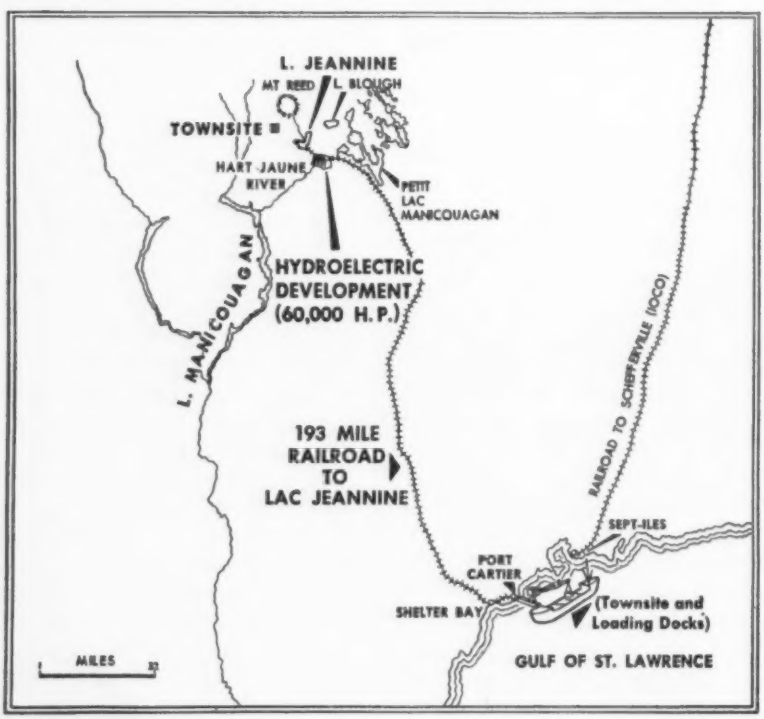
With Quebec's Blessing—On the basis of U. S. Steel's estimates of steel needs over the next 50 years coupled with the need for high Fe content ores to cut down the need for additional blast furnace construction, the firm will have use for all of its major iron ore sources.

The company's railroad has the blessing of Quebec Province. It is a private road—a different status than the Quebec, North Shore and Labrador railroad owned and operated by the Iron Ore Company of Canada, which is a public carrier. It is known, however, the U. S. Steel has privately assured the Quebec government that its road would be available for "other" ore shipments if the occasion arose.

Other Canada Projects—The U. S. Steel development—called Quebec Cartier Mining Co.—is only one of several in upper Quebec (Iron Age, March 6, p. 81). Other projects include: Iron Ore Co. of Canada; Wabush Iron Mines, and many other concessions. The cost of the U. S. Steel project will run to more than $200 million and could easily reach $300 million. The railroad will cost more than $110 million.

The iron ore projects will make Quebec and Labrador one of the greatest ore mining areas in the world—with potential for more than 40 million tons or more a year by 1965. It is singular that in all cases the U. S.-backed projects expect to sell ore abroad as well as in the United States. American companies feel complimented and secure by the friendly attitude of Quebec's Prime Minister Maurice Duplessis who has cooperated more than wholeheartedly in the ore projects.

Quebec Cartier Moves Ahead



Is heat treating costing you more than it should?

A FRANK APPRAISAL OF YOUR METHODS MAY WELL BE IN ORDER!

Every so often, it pays to re-evaluate every production phase in the light of new developments. This is especially true of heat treating. A method change here or a piece of more modern equipment there can spell vitally important cost savings . . . a fact that Ajax has proved in hundreds of cases.

The outstanding basic advantages of salt bath heat treating for most applications are now, of course, well known. These include: faster, more uniform heating by conduction; elimination of atmosphere problems; negligible distortion; ease of selective heating; faster production in less space with unskilled labor; and various others.

Not so well known, however, are important recent developments in salt bath furnace types. The new Ajax design in which a pair of submerged electrodes can be changed in a short time without tearing down the pot is an example. Ajax Cataract Quench Furnaces which give molten salt quenching power equal to that of oil are another. Ajax gas-fired salt baths are still another.

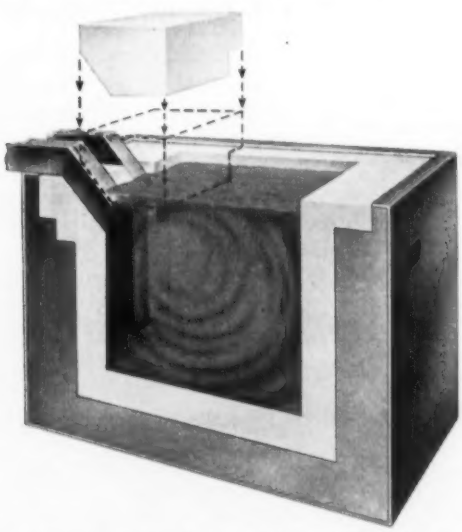
Equally important, there have been 10 league strides in applying salt bath processing to still better advantage and in mechanizing it for substantial labor cost reductions.

As salt bath pioneers and with connections in many parts of the world, it is only natural that Ajax should have led in most of these while being thoroughly familiar with all.

The chief product of Ajax is heat treating "know how" . . . not merely the largest assortment of salt bath furnace types on the market.

Thus Ajax heat treating specialists welcome the opportunity to make recommendations from the background of their unsurpassed experience. While freely admitting that salt baths do not answer every need, they work on the demonstrable knowledge that Ajax Salt Bath Furnaces are scoring important cost reductions on an ever-increasing list of applications while materially boosting quality and efficiency on many.

No obligation is entailed in having Ajax make a frank appraisal of your heat treating situation.



The most efficient heat treating principle for a wide variety of work . . . Pioneered by Ajax in the largest line of furnace types, shapes and sizes for modern production requirements.

AJAX ELECTRIC COMPANY
904 Frankford Avenue
Philadelphia 23, Pa.

AJAX
HULTGREN

SALT BATH FURNACES
Internally heated.
Electric and gas fired types.

Associates: Ajax Engineering Corp., Ajax Electrothermic Corp.

LEADERS IN SALT BATH HEAT TREATING PROGRESS SINCE 1936

Potlines Get Hot at Ravenswood

PRODUCTION BEGINS: Kaiser Aluminum & Chemical Corp. has begun production of aluminum at its $200-million Ravenswood Works. The huge plant is the largest development ever undertaken in West Virginia.

More Prolerizing Scrap Plants Planned

A new type of automated steel scrap processing plant may be built in scrap consuming centers across the country.

Proler Steel Co., Houston, Tex., which recently announced its "Prolerizing" process, is planning a series of plants to cost about $1 million each. Capacity will be about 500-1000 tons per day.

Patents, licensing, financing, and other details are now being worked out, says Sam Proler of the Houston firm.

New System — The Prolerizing system announced recently (The IRON AGE, May 22, 1958, p. 88) is an automated line which pulverizes auto bodies, appliances, and similar sheet scrap into uncontaminated, cigar-box size pieces for openhearth and electric furnace charging.

Steel mill officials who have used the scrap said last week in Houston it has been responsible for increasing yield from openhearths by about 2.5 pct in experimental heats. Density is much higher than conventional busheling.

Major Significance — From the scrap standpoint, the system is potentially of major economic significance. It converts cut auto and appliance scrap, one of the least desirable grades, into No. 1 scrap or better. No price has been disclosed but indications are it will bring several dollars over No. 1. Total output is already sold.

It has special value in areas like the Southwest and Far West where auto scrap is one of the major sources. It will also make it feasible to pull in these low grades from fringe areas on a regular basis.

Mill Changes—Within the mills, the new grade could change charging techniques. Since it will handle like coal or gravel, it can be conveyorized, speeding up furnace charging time.

Aid to Education

The Westinghouse Educational Foundation, a philanthropic arm of the electric corporation, will award $800,000 to colleges, universities and individuals this year.

The net result will be:

One hundred forty-six students will attend college or graduate schools on scholarships.

Five college professors will keep their full-time teaching posts.

Ten colleges and universities will conduct special study programs.

Fifty-five institutions will receive engineering lab equipment, or funds to meet operating or building expense.

Lukens Markets Welding Electrodes

Lukens Steel Co. has branched out into the welding electrode field, becoming the first steel company to market a complete line of electrodes to match its steel plate products.

The company, one of the four top plate producers, says the introduction of the product, known as "Plate Mate," is a significant development in its plate-merchandising plans.

Boost Tinplate Output

Kaiser Steel Corp., Fontana, Calif., has thrown the switch on new tinplate facilities aimed at boosting production by about 85 pct.

Capacity will be upped from 200,000 tons to 370,000 tons annually.

New equipment includes the West's first continuous annealer, new pickling line, temper mill, and electrolytic tinning line.

Bigger Heats by J&L

Jones & Laughlin Steel Corp. is producing 81-ton heats of steel by the basic oxygen process. The steel maker claims this is a world record for oxygen furnaces.

The company says the larger heats permit more convenient handling of the molten metal, with no effect on quality.

FABRICATION WON'T FLAKE TI-CO EITHER

A jai-alai ball travels at speeds over 100 m.p.h.—hits with terrific impact. From a distance of only 60 feet, one of Mexico's leading jai-alai players, Jose Fuerto, slammed the ball into a TI-CO Galvanized Sheet again and again—severely pounding it—but there wasn't a sign of flaking!

In your manufacturing operations, TI-CO can be deep drawn, stamped, bent, crimped, lock-seamed, even spin-drawn, without flaking or peeling. In fact, any product that can be made from cold rolled steel can be made from TI-CO, giving your product dependable protection against corrosion and an eye-appealing finish that can mean stepped-up saleability.

If you are designing or manufacturing a metal product that requires rugged strength plus corrosion resistance, you'll find TI-CO Galvanized Sheets the practical and economical solution. Coils or cut lengths up to 60" widths; gages 8 to 30 inclusive. Consult your local steel distributor or Inland representative. Write today for a free, informative booklet on TI-CO.

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INLAND STEEL

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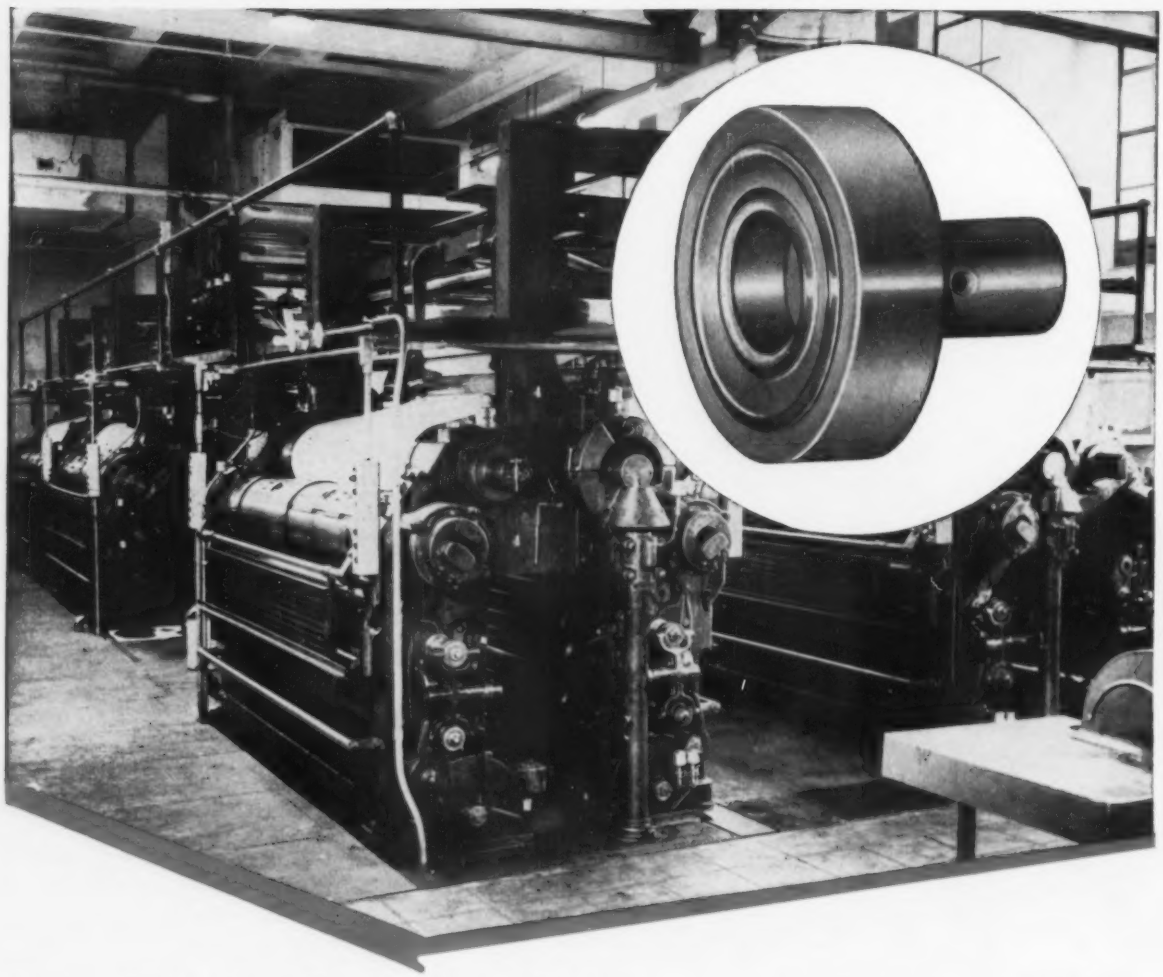

It's Bearings, Inc. wherever shafts or wheels turn. We have the experience . . . . the bearings to solve any problem!

Even on printing presses such as this at the Warren, Ohio, Tribune Chronicle. As originally built, the shafts on the ductor and plate rolls turned in a metal to metal housing. Wear on the shafts made complete adjustments necessary with every roll change. The rolls would not distribute the ink properly and the printed pages were heavy with ink on one end, light on the other.

By incorporating the studded bearing housing, shown above, all the rolls are held evenly and adjustment remains constant. All shafts were shortened to accommodate the bearing housing stud length, with anti-friction bearings.

Fifty of these housings and ball bearings are now installed and according to the press room foreman, Jack Marlin, they are doing a great job. Roll changes are now made in much less time and the ink is evenly distributed over the printed pages.

You probably don't have a printing press in your plant, but you would be exceptional if you didn't have bearing problems — We're on call, 24 hours a day, to help you solve them — Call the branch nearest you for quick, experienced service.

Providing bearing service in the North ➤ **BEARINGS, INC.**

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Toledo • Youngstown • Zanesville
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Walter N. Howley

A Small Business Man Speaks Up

Mr. Howley is one of the nation's leading experts on hot tubular forgings.

It's his aim to preserve the kind of environment that made his company's growth possible.

WALTER N. HOWLEY: Small companies need a creative environment.

▪ Walter N. Howley is a self-described "monkey wrench metallurgist" who earned a reputation for himself in the field of hot tubular forgings.

Thirty-three years ago, he and three partners set up shop in the backyard of his Lansdowne, Pa., home and proceeded to perfect a method of hot forging which employs continuous production at great savings in time and material.

Out of this backyard venture grew Lansdowne Steel & Iron Co., now located in Morton, Pa. And Mr. Howley, the firm's president, claims to have the best equipped plant for development and pilot plant production of tubular forgings in the world.

Small but Good—In 1940, the Army chose his company to build and operate the nation's largest ordnance shell plant at Gadsden, Ala. His was the only small company among the first 13 firms selected to build and operate government-owned defense plants for the U. S. preparedness program prior to World War II.

Lansdowne Steel & Iron also specializes in making pile fabric weaving equipment and certain types of hydraulic machinery. One of Mr. Howley's proudest accomplishments: A wilton carpet loom that is considerably ahead of anything in its field.

His Viewpoint—Mr. Howley has turned down a number of offers to join large companies. He sees many advantages in running a small, efficient operation. It's his aim to preserve the business climate in which a small company such as his own was able to grow and flourish.

Small business is the backbone of our economy, Mr. Howley believes. He regrets "that Government is encroaching on private enterprise and that big business is encroaching into government functions."

A Way Out—"The greatest aid the Government can give small business is recognition that it is well qualified to carry on research and development," he says. He recommends that the Government maintain defense production in small companies so that they will have the environment to use their talents in this field.

About Defense Contracts—Mr. Howley cautions that too large a share of defense spending is being funneled into big business. "This is not only seriously detrimental to small business but contrary to national security," he warns.

He also recommends a revision in tariff policy to enable small business to cope with foreign competition. He does not believe that income tax relief is the answer to the small business problem.

Quantity
PRODUCTION
of
GREY IRON CASTINGS

*

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

*

ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE

For Now, Watch the Short Term

With no major boom in the near future, it's good business to concentrate on day-to-day developments.

The recession apparently has reached bottom. But there's no free ride back to 1956 levels.

▪ In conducting your business in the months ahead, it will pay you to pay closer attention to short term prospects.

This doesn't mean you should neglect the long-range outlook. But in the absence of any major upturn in the immediate future, you will get more results by taking advantage of whatever the immediate situation offers.

No Boom to Ride On—In short, you can't count on a major national boom to carry you along on its own momentum of an expanding economy and mushrooming markets. You may have to wait until the 60's for a repetition of the 1955-56-57 boom.

There are two major facts that you will have to face:

The consumer of major durables is on a buyer's strike. You can take your pick of many reasons, ranging from dissatisfaction with new automobiles to general uncertainty. The fact remains that consumer durables have lagged behind normal expectations for several years.

Idle Capacity Hurts—The capital goods boom is over for some time. While industry is not over-expanded, today's idle capacity gives that impression. Outlays for new plants and equipment will continue on the downgrade into 1959.

There is every indication that the recession has reached the bottom. Some segments of business will find the bottom is not so bad.

Production Below Consumption—In many respects, however, the outward picture is misleading. For example, inventory policies have been near disastrous. But for some time production has continued below volume of sales or, as in the case of steel, below the rate of consumption. This can't go on forever.

Many elements of business are reporting brisk upturns in orders. Consumer income is holding up well, everything considered. The farm implement market is booming and construction is picking up, although only seasonally.

Smaller Markets—Generally speaking, you will be faced with a smaller market, but, nevertheless, a very live one. Your success will depend on how you can develop it, and increase your share.

P.A.'s Still Slash Inventories

Here's an example: Today, you might get a better reflection of the immediate business outlook from first-hand knowledge of purchasing plans across the industry.

The latest survey of the National Association of Purchasing Agents shows a continuation of the uptrend in new orders that started in February. This month 36 pct report their position is better than a month ago; 45 pct see no change; 19 pct report a decrease.

Best Since '56—The survey says that not since the fall of 1956 have so many reported an improved situation.

Following improved orders, 29 pct say their production is up, as contrasted to only 16 pct a month ago.

Nevertheless, the P. A.'s still can't see a particularly bright short-term outlook and many see an inevitable summer lull.

Prices Are Down—Many report they can obtain materials at lower prices, but instead of stimulating buying, this price weakness apparently contributes to the general tendency to continue inventory cuts.

P. A.'s see no letup in the inventory reduction now being conducted. They report that management and the P. A.'s themselves are still reducing material. And, they plan their operations with confidence of prompt shipment.

Sharp Ups and Downs

Orders for industrial heating equipment point out the need of keeping up with the day-to-day developments in your own field.

The Industrial Heating Equipment Assn. reports that for the industry as a whole, business is about at the 1954 level with no upturn in sight.

Yet orders for April showed an increase of 24 pct over the March volume.

In actual volume, orders for industrial furnaces in April totaled $3,572,000. Business for the first four months of 1958 reached only $13,176,000, compared with $28,007,000 in the same period of 1957.

AUTOMOTIVE

Automation Isn't Always Best

Parts Supplier Backs Away for More Flexibility

A. O. Smith's auto frame plant is less automated today than its first plant, built in 1918.

The reason: More frequent changes cause shorter runs, and puts the emphasis on flexibility. —By H. R. Neal.

■ The continuing trend toward more frequent product changes in the automobile industry affects suppliers as well as the automobile companies.

Manufacturing methods must be revised to remain competitive. Often this has meant more use of automation. But not always, says John R. Parker, director of sales and engineering for A. O. Smith Corp.'s automotive division.

Less Not More — "Actually, we've had to back-off from some automation over the years," Mr. Parker says. "The multiplicity of models developed by the auto companies has required a corresponding increase in auto frame models as well. But this has also meant production runs are smaller for each frame. And auto companies usually have at least two sources, which further reduces the size of a production run."

A. O. Smith's first automatic frame line, built around 1918, was probably one of the first real examples of automation in American industry, Mr. Parker believes. At that time it could make 400 Chevrolet frames an hour with about 200 employes. Labor cost of the frames ran about 10¢ each. "Currently, we don't have any of our frame manufacturing automated to the extent this old plant was," he said.

More Frames—Why? The Milwaukee parts supplier produces 7 to 9 frames each for Pontiac and Oldsmobile, another seven for Cadillac—on four wheelbases. Frames differ between hardtops, sedans and convertibles; and between steel spring suspension and air suspension models.

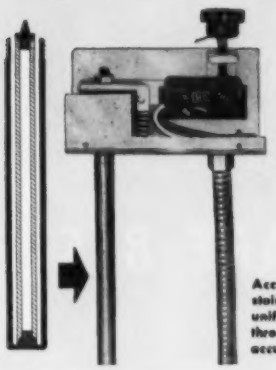
Previously, Mr. Parker explains, when the structure of the automobile had less of an effect on total design, it was possible to use the same or at least a similar frame for a number of new models. "But now, style changes also mean a change in the floor shape, and this calls for a change in the frame."

Flexibility Counts — Ability to make these changes each year is more important than ability to automate the job for production, according to the frame engineer. "Remaining flexible is a must, if we're to give customers what they want," he said.

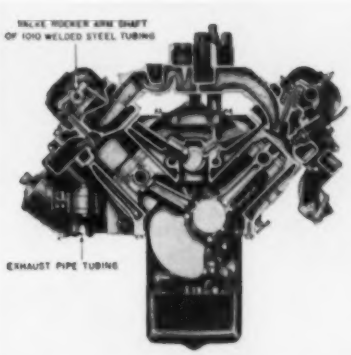
For an idea of the degree of flexibility required, he explained there are about 40 pieces to the average frame. And for each new model some 20 changes per piece are made between the time drawings are released to Smith and the time

Offspring of the Mechanical Mule

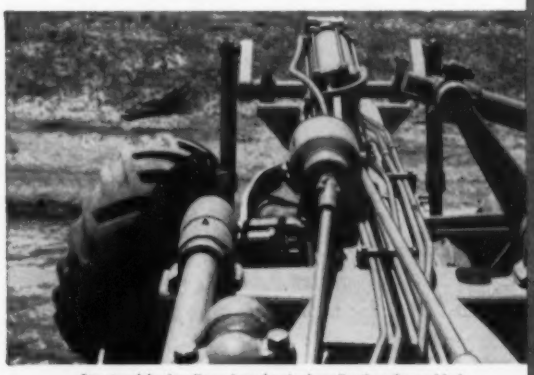
FLEXIBLE: A new ¾-ton vehicle was developed by Willys Motors because of the success of its ½-ton weapons carrier, the Mule. The new vehicle converts quickly from a six-man personnel carrier to a truck. The seats fold to form the bed. It is powered by a four-cylinder, air-cooled aluminum engine, has two or four wheel steering.



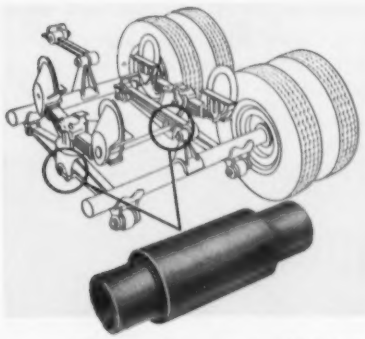
Accurately telescoped welded stainless steel tubing assures uniform temperature gaging through positive dimensional accuracy.



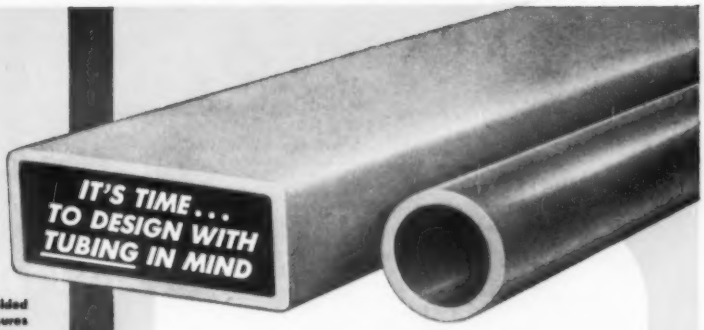
Mechanical parts such as hollow shafts or complex exhaust systems are served equally well by *welded* steel tubing.



Structural, hydraulic and mechanical applications for welded steel tubing show clearly in this roadbuilding equipment.



Dimensional accuracy of welded steel tubing makes this bushing economical, eliminates machining.



WHERE MECHANICAL EFFICIENCY MUST BE SERVED

Use

WELDED TUBING

Carbon • Alloy • Stainless Steel

Only *welded* tubing combines the advantages of a tube's hollow form and structural strength with exceptional mechanical efficiency resulting from uniform wall thickness, concentricity, accurate dimensions and general adaptability to fabrication of all kinds.

Welded tubing is available from your quality tube producers in all weldable grades of steel in a full range of sizes.

It's time to design with *welded* tubing in mind!

COMPLIMENTARY TECHNICAL HANDBOOK

260 fact-packed pages of design data for Welded Steel Tubing. For your copy write on your company letterhead and give your title.

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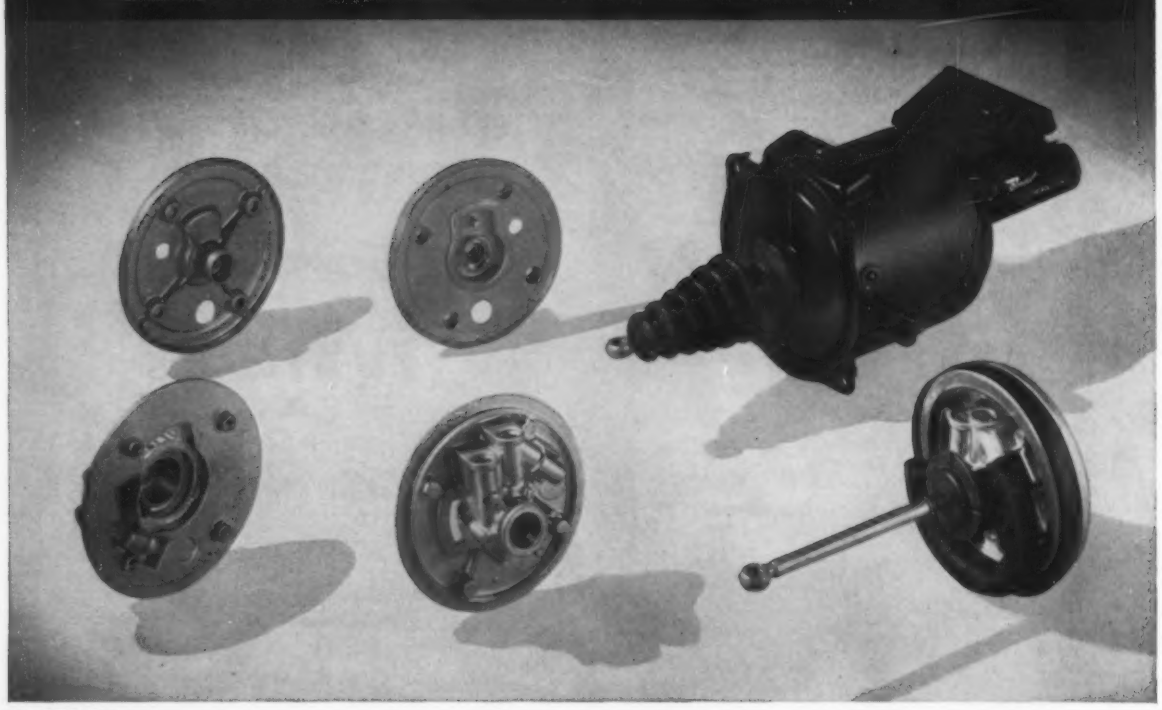
FOR Eliminating Extra Parts AND Extra Machining

ZINC DIE CASTINGS ARE BEST



Bendix engineers designed this piston and control valve assembly for the Treadle-Vac Power Brake so the entire mechanism could be built around these two intricate ZINC Die Castings.

Extra parts—as well as extra machining—were eliminated by the use of ZINC Die Castings.

Front and back views of the two castings show the cored holes and bosses used in locating and fitting the internal parts. Both plates are quickly prepared for assembly by a single machining operation and locked together as a unit containing the poppet valves, springs, diaphragms and other necessary equipment.

Bendix engineers gained additional advantages by using ZINC Die Castings. Ribbing, for instance, permitted the use of metal-saving thin wall sections while providing more than ample strength for the job. They knew, from previous experience, that die life is longer with ZINC than with other die casting materials.

Why not see your die caster and find out how such parts-saving and time-saving advantages can be used in your products?

HORSE HEAD SPECIAL ZINC AND HORSE HEAD ZAMAK ARE PRODUCED BY

THE NEW JERSEY ZINC COMPANY

DEVELOPERS OF THE MODERN ZINC DIE CASTING ALLOYS IN USE TODAY

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HORSE HEAD PRODUCTS ®

Automotive Production

WEEK ENDING	CARS	TRUCKS
May 31, 1958	66,340	15,578
May 24, 1958	86,589	18,001
June 1, 1957	82,431	17,519
May 25,1957	127,428	23,407
TO DATE 1958	1,906,200	377,400
TO DATE 1957	2,873,900	486,300

*Preliminary Source: Ward's Reports

the frame goes into production. It amounts to about 800 to 900 changes. "We suggest changes as well as the customer," he said. "The idea is to give the customer the best product for the least cost."

Teamwork — To ensure orderly progress in getting the design into production, project teams have been established in A. O. Smith's engineering department. There are separate teams for Cadillac, Oldsmobile, and Pontiac; with each team meeting at least once a week to compare notes. As production time nears, or if a particularly knotty problem develops, the teams meet more often.

The team idea developed from a plan, put into effect the previous year, in which one engineer was assigneed duties as a "coordinator." His job was to keep track of progress on all new frame projects. While this was an improvement over the old system of everyone going his own way without a reporting system, the revised plan is considerably more efficient and effective.

Practical Auto Radar Is Being Tested

An automobile radar system that automatically warns a motorist of traffic hazards is now being road tested. At the same time a production version is under development in the Detroit research laboratories of Bendix Aviation Corp.

Mass Production—Dr. Winston E. Kock, director of the laboratories, said manufacture of the device at a practical price presents no real difficulty. Such a system he estimates would cost below $200 on a mass production basis.

While automotive companies and safety groups have expressed enthusiasm for the warning device, production and marketing plans have not been formulated. It is doubtful that the unit will be available this year.

A platter-sized radar antenna mounted in the front radiator grille of the car sends signals which are converted into a "beep-beep." If a motorist is overtaking another car or object at moderate speed the sound is faint. As the car approaches the other object, the sound warning becomes stronger.

Advantages—The system doesn't rely on other vehicles having complementary equipment, or on any other highway equipment.

Growth of U. S. Cars

How much have American cars grown in the past 20 yrs? The average of the eight best-selling American made cars has increased 18.2 in. in length and 6.8 in. in width, according to a survey by an independent reportorial firm for American Motors Corp.

Average of the eight cars, the survey found, is 211.7 in., or 17.5 ft, compared with 193.5 in., or 16 ft in 1938. Width has increased from 70.8 in. to 77.6 in. during the period.

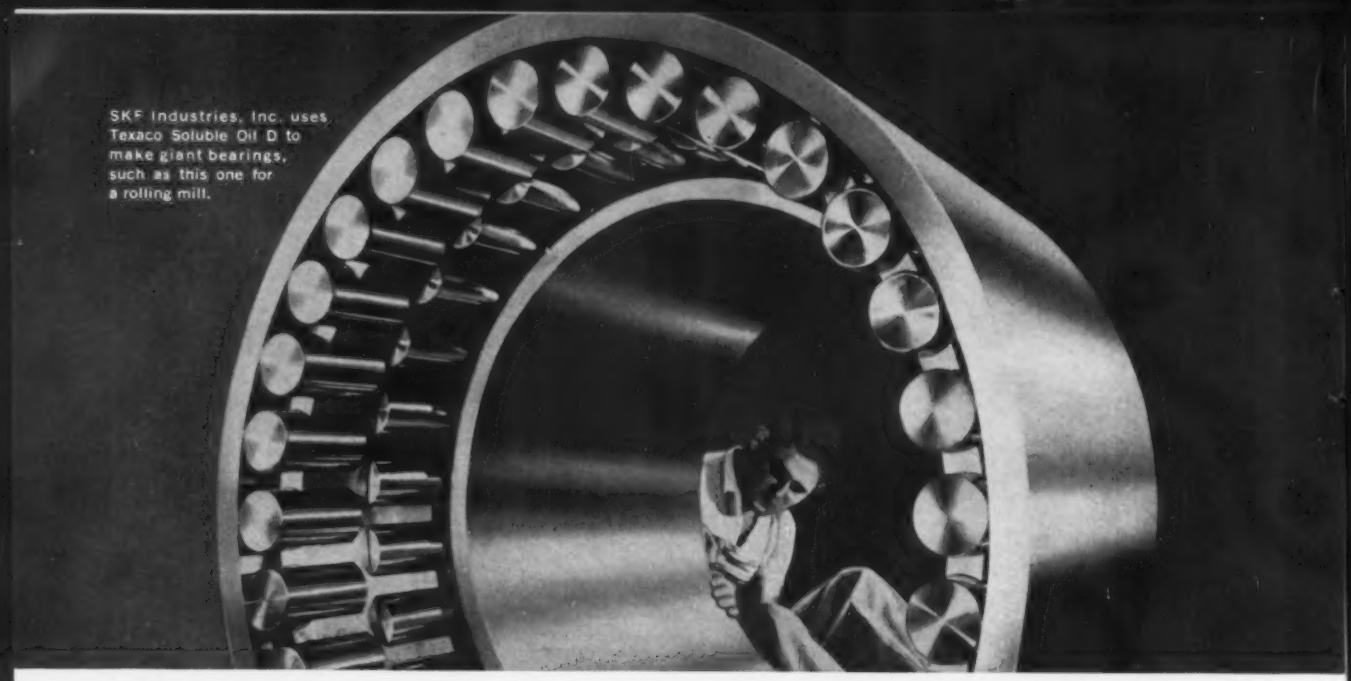
By contrast, AMC notes the lengths of its products: Metropolitan, 149.5 in.; Rambler American, 179.3 in.; Rambler, 191.2 in.; and Ambassador, 200.2 in. Mexi-mum width for AMC's widest car is 73 in., the firm says.

Left Foot Is Faster

Using the left foot for braking enables the driver to react more quickly in emergencies, according to Dodge chief engineer George Gibson. Studies with cars equipped with automatic transmissions showed left foot braking reduced reaction time by 3/10 of a second. Translated into distance, Mr. Gibson said, it means a motorist traveling at 30 mph cuts his stopping distance by more than 13 ft.

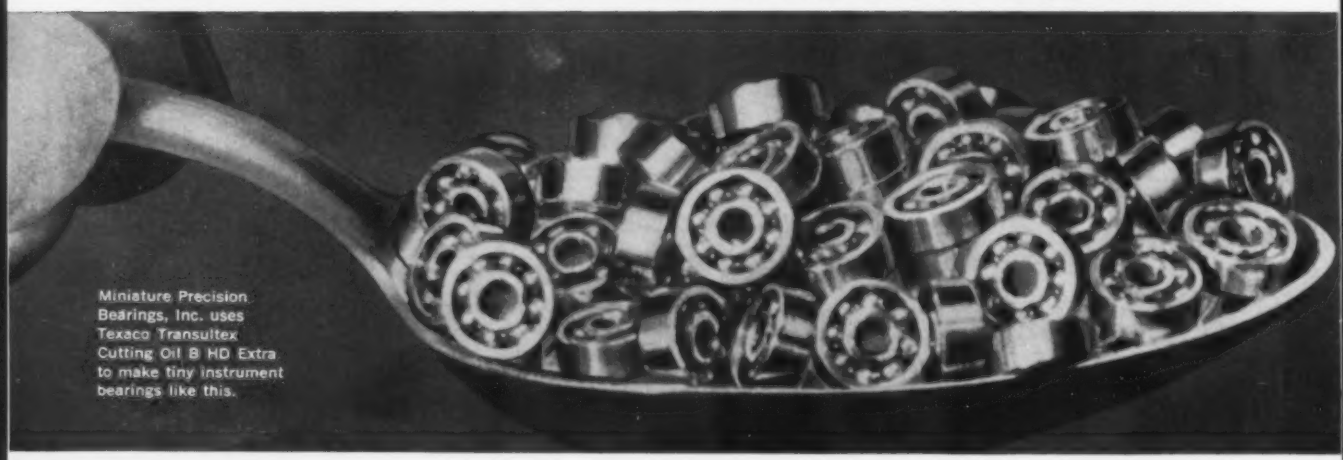
THE BULL OF THE WOODS

THERE! TH' FIX TH' BULL O' TH' WOODS IS IN IS TH' REASON I DON'T BELIEVE IN DIGNITY-- BECUZ, WHEN YOU DO LOSE YOUR DIGNITY, NO FOOL LOOKS AS FOOLISH!
YEH--HE LOOKS SO FOOLISH RIGHT NOW THAT IT WOULD PRETTY NEAR PAY HIM TO GO AROUND LOOKIN' A LITTLE FOOLISH ALL TH' TIME, TO KEEP FROM LOOKIN' THAT FOOLISH ANY TIME!
THE BIG DROP
T.M. Reg. U.S. Pat. Off.
© 1958 by NEA Service, Inc.



SKF Industries, Inc. uses Texaco Soluble Oil D to make giant bearings, such as this one for a rolling mill.

WHAT SIZE IS YOUR MACHINING PROBLEM?



Miniature Precision Bearings, Inc. uses Texaco Transultex Cutting Oil B HD Extra to make tiny instrument bearings like this.

If you make anti-friction bearings of any size, you need grinding fluids that prevent rust and produce uniformly fine finishes. These fluids must also take into account the bearing material and the operating condition of your machines. They must have specific stability, cooling properties and ability to settle grinding dirt quickly. Otherwise your production drops and the number of rejects rises.

The makers of the small and large bearings shown above get fine bearing finishes and high production by using Texaco. There is a complete line of Texaco Cutting, Grinding and Soluble Oils to help improve machining on every job.

Take this tip. Use Texaco Cutting, Grinding and Soluble Oils—they'll help you produce faster, better and at lower cost, whether your product is the largest or the smallest.

Let a Texaco Lubrication Engineer suggest the best ones for your jobs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Business Faces Tighter Controls

Defense Demands Strengthen Bureaucratic Grip

Defense Secretary warns that business can't escape tighter controls as the defense budget continues to climb.

Management may have to face even greater government influence on its decisions and policies in the future.—By G. H. Baker.

▪ Business management is going to find even more of its production decisions made in Washington in the years ahead.

Not only is there going to be no lessening of existing Federal controls, but a greater volume of orders from Washington will tend to restrict management to conform to decisions made in the capital.

Gradual Tightening — This bureaucratic influence will extend even into the areas of production and marketing of industrial output.

The strengthening of Federal controls comes about so gradually that it isn't always noticeable. But today, for example, almost every major Federal control program (except consumer price controls) administered during World War II and again in the Korean War is still in effect.

This includes production controls, renegotiation, high taxes, stockpiling—and there are no plans to abandon any of these.

McElroy's Warning—And more controls are coming, according to Defense Secretary McElroy, the Administration's chief spokesman on military matters. Here's what he says about the years immediately ahead:

"The demands of our defense budget will become such that this nation will face eventual rigid control of the economy.

"I am stating this as more than just a possibility."

Prepare Now—Point is, this eye-opening prediction comes not from an irresponsible politician, but from a man who—along with the military chiefs of staff—knows more than any man in Washington about the current and future demands of the U. S. His words carry much importance.

And it is significant that he would not have spoken them unless he believed it necessary to start now to prepare management men for what's to come in future years. Evidently, he doesn't want future announcements of controls to come as a complete shock. It's a grim picture but it undoubtedly is a realistic one.

Pentagon Shift Helps Metalworking

The Army is planning to step up its buying of so-called conventional (non-nuclear) weapons. This means increased procurement of planes, tanks, trucks and other automotive vehicles, guns, and ammo, all metalworking products.

The Army successfully sold the new spending program to the Secretary of Defense on the grounds that limited wars, not full-scale atomic wars, will be the greater danger in the years immediately ahead.

STRAC Is Ready—To plan specific defense and attack strategy in the so-called limited wars of the future, the Army has created the Strategic Army Corps (STRAC). Its components include both airborne and infantry divisions, plus the necessary supporting (supply) units.

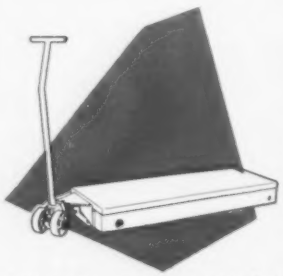
STRAC, the Army promises, will be "operationally ready on a moment's notice."

Ever since the Korean war, military men have been debating among themselves whether the U. S. should prepare for an all-out atomic holocaust, for a series of Korean-type wars, or for both.

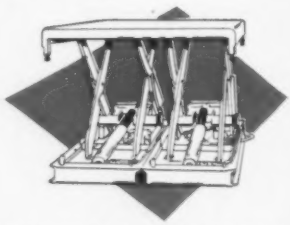
Both Types—It is now evident that the high command has decided the answer is "both."

Here is the essence of top Pentagon thinking on the subject:

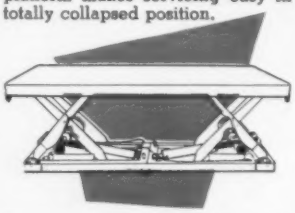
A military stalemate between the U. S. and the U.S.S.R. exists and will continue indefinitely. Realizing this, the aggressor will from time to time wage limited (Korea-type) wars here and there around the world so that his advance will be measured in small degrees, not in great gains. But unless we are prepared to recognize this type of aggression, and to repel it, Russia will bit by bit gain its military objectives without ever having dropped an A-bomb.



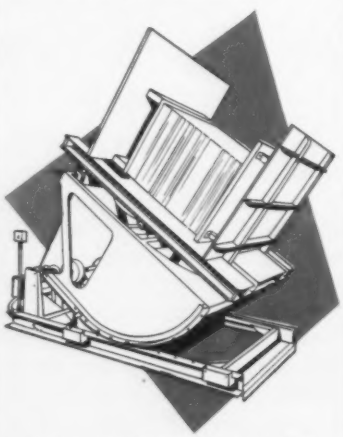
Southworth Portable 2000 lb. Lift Table shown collapsed with dolly. Can be used to shift light loads on short hauls. No installation cost. Simply plug it in.



Southworth Twin (48" x 53" min.) Lift Tables available in varying capacities up to 24,000 lbs. Hinged platform makes servicing easy in totally collapsed position.

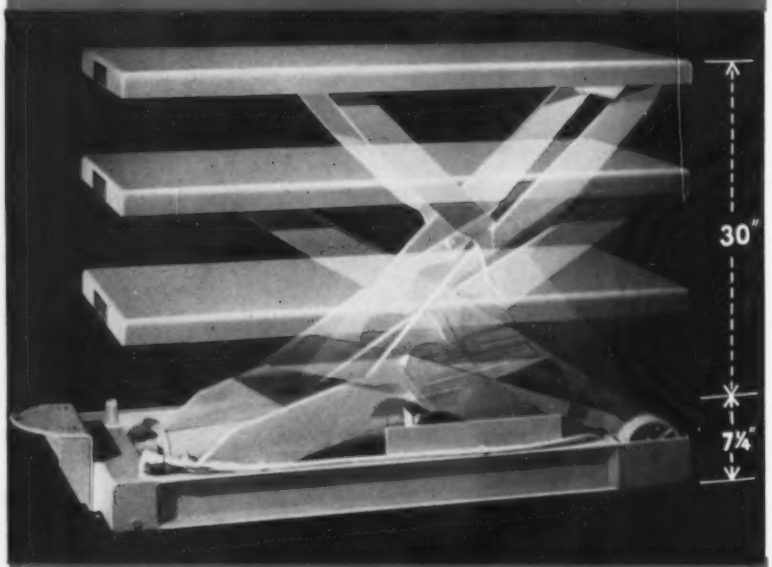


Southworth Tandem (24" x 106" min.) Lift Table available also in capacities up to 24,000 lbs. Note entirely self-contained pump assembly and working parts.



Southworth Skid-Turner turns full skid of material in less than three minutes. One man operated. Push button control. Capacity 5,000 lbs.

THE NEW PORTABLE SOUTHWORTH LIFT TABLE



WHATEVER WORKING HEIGHT YOU WANT WHEN AND WHERE YOU WANT IT

■ In industry after industry, the Southworth Lift Table is cutting handling costs by providing an easy way of elevating skid or palletized loads to a correct working height for machine, process or assembly operations. The required lift may be in one stage from skid level to an established working level, as with dies, castings and fixtures, etc. Or it may entail frequent adjustment of stock height, as in sheet feeding, sorting and inspection. Either way, the lift desired is a mere matter of simple switch control, with free access to the load by the operator from all angles at all times. In addition, this new Lift Table may be easily *relocated* by means of a detachable skid spotter or dolly . . . serving as a loading lift in conveyor systems, or a work positioner of multiple applications.

BASIC SPECIFICATIONS

Capacities:	2000 lbs.	4000 lbs.	6000 lbs. 8000 lbs.
Platform Size (Min.)	19½" x 53"	24" x 53"	30" x 60"
Collapsed Height	6"	7"	8"
Extended Height	36"	37"	40"

Controls . . . . . **Foot or Hand Switch**
Motors . . . . . **Single phase on Standard Models**
Hydraulics . . . **Pump actuated ram with relief and solenoid valves.**

Larger, or special purpose, platforms available on all standard models. Greater vertical platform travel also available in a variety of capacities. Write for specifications on these and on other tables with capacities up to 24,000 lbs.

For Further Details Write:

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Northwest Pushes Expansion

Area Confident of Continued Economic Growth

Industry in the Pacific Northwest is busy keeping pace with the area's enlarging population and markets.

Seattle, where large-scale construction program is underway, mirrors this optimistic outlook.—By R. R. Kay.

While there's recession talk elsewhere businessmen in the Pacific Northwest are pushing ahead with expansion plans.

They're trying to keep pace with the area's rapid growth in population and markets. It's estimated that within seven years there will be 33 pct more people in the region; today's population will double in 15 years.

Evidence of Faith—Downtown Seattle, where 12 major building projects have run up a $39 million construction total, illustrates what's been done.

Commenting on this unprecedented change in the city's skyline Wheeler Gray, vice chairman of the Seattle Area Industrial Council, says:

"It reflects optimism and faith in the city's economic future."

However, it's realized much remains to be done. Director H. Dewayne Kreager of Washington State's new commerce and economic development department says changes must be made before the state has a "favorable business climate" and before new factories are built.

Raw Material Supplier — While Washington's population will go up a third within the decade, he says state boosters should not forget that heavy markets will remain in the East.

"Whether we like it or not," he says, "We will continue to have for many years an economy based heavily on raw material production."

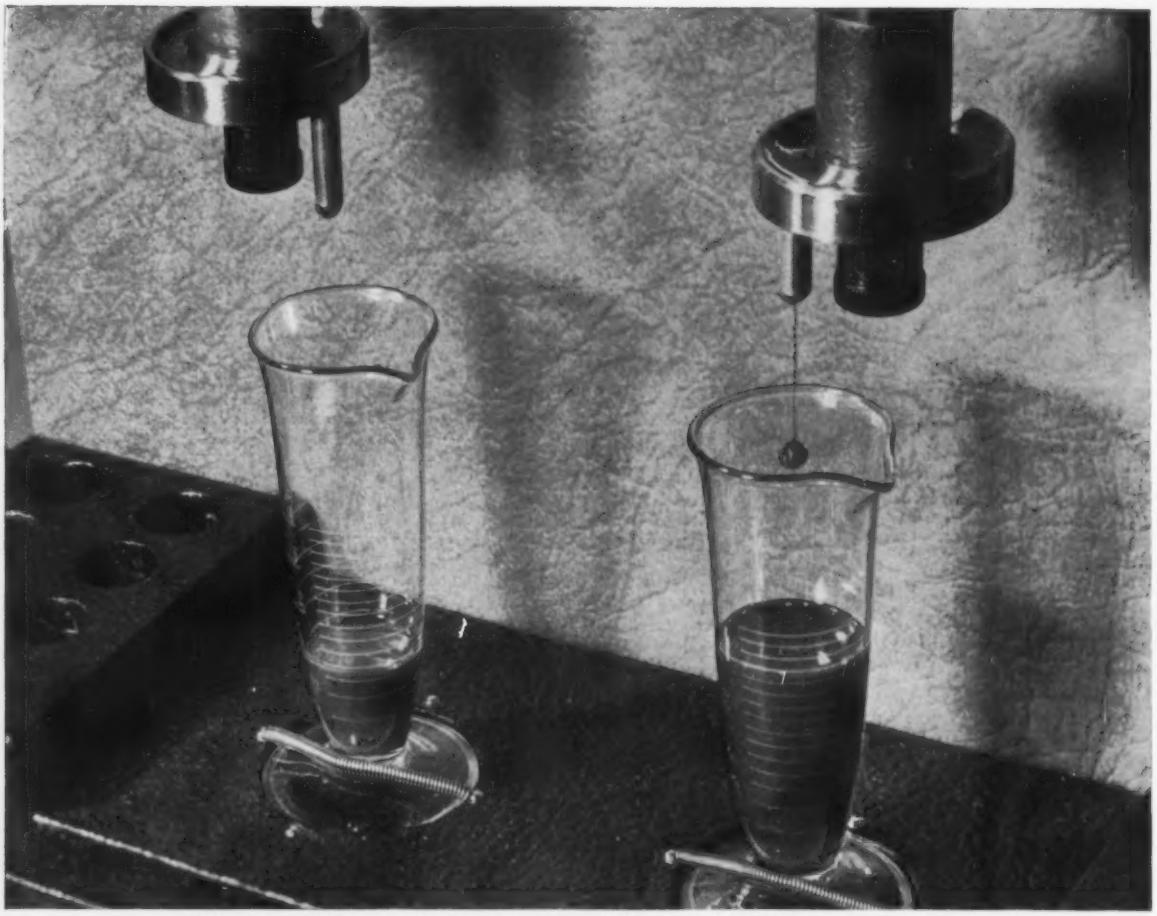
What's Wanted—For companies looking for opportunities the Northwest is a promising area. A New York economist, Robert H. Ryan, Director of area development for the National Committee for Economic Development, lists these fields as "significant":

Additional small petroleum refineries, more production of cement, lime, clay, sand, gravel, abrasives, and lightweight aggregates. Also required is processing of refined metals or products from ore concentrates shipped from Alaska, and manufacture of heavy tools, cutlery, and edge tools.

Boeing Important — The big question mark is Seattle's largest industrial enterprise, the Boeing Airplane Co., to whose fortunes the economic health of the region is now tied. More than 60,000 persons owe their livelihood directly to Boeing. When Boeing is affected by tight money or cutbacks in Defense Department appropriations, the entire Pacific Northwest suffers.

Steel Gives Support for Better Viewing

HORSESHOE-SHAPED FRAMES: Fifteen of these 65 ft frames will be used on grandstand now under construction at Stockton, Calif. The building's cantilever roof, fabricated from Kaiser Steel plate by National Iron Works, is designed to give spectators an unobstructed view.



The oils collecting in these graduates are being forced, at 100 psi, through two sintered bronze bearings. Although each oil has the same viscosity, the Suntac on the left is leaking *only one quarter as much as* the straight oil on the right.

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Can Builders Beat the Tax Bite?

Taxes and Depreciation Hold Back Tool Buying

Head of NMTBA says it's up to makers of machine tools to develop products that users can't afford not to buy.

But taxes and depreciation laws place a double burden on industry.—By E. J. Egan, Jr.

▪ Makers of machine tools and other production equipment can lead the U. S. out of the recession with new models and new methods, says Alfred V. Bodine, president of the National Machine Tool Builders' Assn.

But he put engineers attending the recent Vickers Production Machine Tool Hydraulic Forum on notice that the only way this can be done "is for technology to advance even faster than before."

Create Obsolescence — New models and new methods must be so effective, Mr. Bodine said, "that in spite of tax . . . difficulties metalworking manufacturers simply can no longer afford to run their old machines, and must of necessity get new ones. That to my mind, is the only sure way out of the business recession."

Noting that manufacturers are extremely hesitant about replacing obsolete machine tools, the NMTBA president said he saw two main reasons for this.

Tax Bite Hurts — One is the Government's 52-pct tax rate. The NMTB head explained how this would affect a hypothetical "John Jones, who runs a metalworking shop."

For Jones "to hold his business," he said, "he must improve quality, reduce prices, or both. But he can't cut wages. He's in a squeeze. He knows he should spend $50,000, right now, for new machine tools.

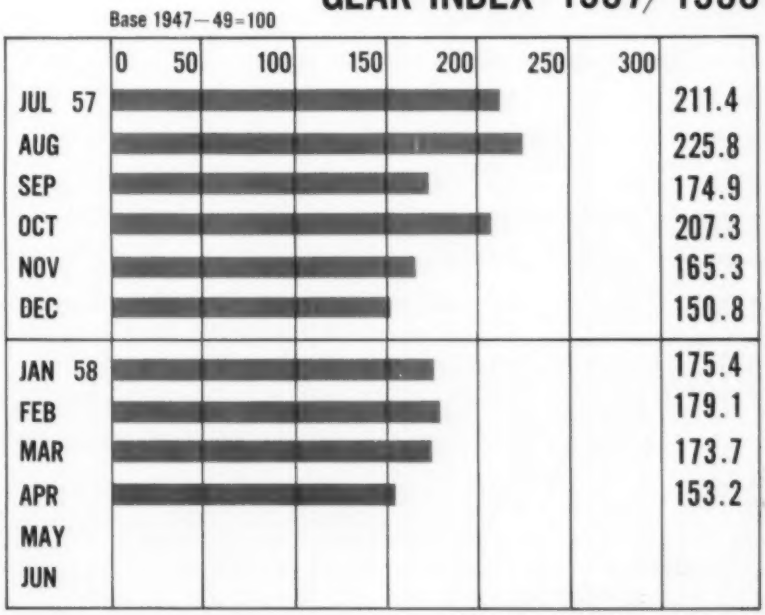
"But where is he going to get the money? If he does succeed in making a profit, the government is going to take 52 pct of it . . . profits must now be doubled in order to maintain the same equilibrium and stability. This picture scares him. He's afraid to spend money, although he knows he ought to."

Depreciation Factor — The second reason for hesitating to buy new equipment comes into play at this point, Mr. Bodine explained. He said "Jones" might decide to risk the $50,000 in spite of the tax rate if he thought he could recover it in tax-free depreciation allowances in a reasonable time. "But if he has to wait 20 years—that's too long. So he hesitates."

So the use of new ways to increase productivity—which could point the way out of the recession—is being blocked by tax, depreciation, and tariff factors "which have nothing to do with scientific progress," he said.

Technology Needed — "These things must somehow be corrected. But until they can be corrected we must somehow go forward in spite of them; and the only way we can do this is for technology to advance even faster than before. Our future," he emphasized, "lies primarily in the hands of the engineers and the experts in product design and development. It is to you that we look for business recovery, and for the progress of tomorrow."

GEAR INDEX 1957/1958



Source: American Gear Manufacturers Assn.

INDUSTRIAL BRIEFS

Sales Blast-Off—A missile sales conference for New England will be held by the Assn. of Missile & Rocket Industries, June 24, Bond Hotel, Hartford, Conn. The one-day meeting will feature panel discussions by experts from leading companies in missile propulsion, guidance, frames, and support, together with government procurement officers.

Who's Buying? — A Missile Salesmen's Guide has been prepared by the Assn. of Missile & Rocket Industries, 1079 National Press Bldg., Washington 4, D. C. The AMRI version is to show where the business is to be found among hundreds of missile contracts while other directories are arranged for buyers.

Switch On — Cutler - Hammer, Inc., started production lines moving at a new $4 million plant at Lincoln, Ill. The plant is producing safety switches at present. Other production lines for making low voltage distribution equipment are to begin operations in the months ahead.

"The man who works on your left likes fishing. You'll soon find out what the man on your right likes."

Fair Plans—Factory equipment, small shops, and farm exhibits of the type that Poland is interested in for her own economy will highlight the U. S. Government Exhibit at The 27th International Trade Fair at Poznan, Poland, June 8-22.

Up Periscope—American Bosch Arma Corp. has a $3.2 million contract by the Navy for the production of additional fire control systems for submarines. Production of the systems will be accomplished at its Arma Div., Roosevelt Field, Long Island.

Inland and South—Inland Steel Co., Chicago, will open a district sales office in Houston, Tex. on July 1. The new Inland office will be located in the Texas National Bank Bldg. at 1300 Main St.

Recognition—Dr. J. F. Thompson, chairman of the board, The International Nickel Co. of Canada, Ltd. has been awarded the Gold Medal of The Institution of Mining and Metallurgy for 1957. He was recognized for his distinguished services to metallurgical science research practice, with special reference to the nickel industry.

Enameling Plan—Bettinger Corp., Waltham, Mass., has established two new departments—Production Whiteware and Production Sign, to gear for mass production. Divisions were set up to handle increased capacity that Bettinger will have in its new facility, scheduled for opening this summer.

Patent Bonus — For inventions leading to the development of Westing-arc welding systems, Westinghouse has presented $9000 in patent awards to six engineers and research scientists. Those recognized were: H. J. Bichsel, G. H. Cotter, J. F. Miller and Alfred Baeslack of Buffalo, N. Y.; Howard Ludwig and Julius Heuschkel of Pittsburgh.

Russian Plastics Tour—The Society of the Plastics Industry, Inc., New York, announced arrangements are completed for a delegation of U. S. plastics manufacturers to visit the U.S.S.R.

Moving Day — More than 500 machines are moved between two plants at Thorold and Merritton, Ont., by Hayes Steel Products Ltd., Canadian affiliate of Dana Corp. The big move was part of a modernization program aimed at separating product lines.

No Contest—Powder Metallurgy Parts Manufacturer's Assn. elected as its treasurer Smith Bolton, president of U. S. Graphite Co., Saginaw, Mich.

Gary Honored—A bronze statue of one of the most famous men in the history of steelmaking, Judge Elbert H. Gary, will be dedicated June 18 on the lawn at City Hall, Gary, Ind. The 9-ft statue is being presented to the city by U. S. Steel Corp. in memory of its first board chairman.

Monsanto Premiere — Monsanto Chemical Co. is offering a 35-mm 20 min. color film entitled "Shell Molding Techniques." It describes both dump-box mixing and sand coatings, as well as the production of dumped and blown shells and cores. It may be obtained from the Dept. SM, Monsanto Chemical Co., Springfield, Mass.

Pipe to Panhandle—Dravo Corp., Pittsburgh, has been awarded a contract to fabricate piping for a 50,000 kw generator for West Texas Utilities Co., Abilene, Tex. Piping will be installed at the company's Paint Creek Station, Haskell, Tex., by Brown & Root, Inc., Houston, Tex.

New Division — Sperry Gyroscope Co. will form a separate field service and repair division. New division will direct the operation of customer technical training schools, as well as the company's international network of district offices and field service representatives.

Home of Their Own—The Central Office of Borg-Warner Corp. has moved to the new Borg-Warner Bldg. at 200 S. Michigan Ave., Chicago. The corporation vacated space in the Continental Companies Bldg., 310 S. Michigan Ave., after 30 years.

PROOF: B&W Refractories withstand CO and H_2 prepared atmospheres

ATMOSPHERE	APPLICATION	CONSTRUCTION	RESULTS
60% CO	Pusher Type Malleabilizing Furnace	Walls lined with B&W K-23 Insulating Firebrick backed with B&W K-20 IFB. Roof construction—9′-0″ wide sprung arch of B&W K-23 IFB.	No major rebuilding in 21 years.
40% CO	Radiant Tube Annealing Furnaces Malleable Iron Company	Bases lined with 7″ Kaocrete-A, backed with 6″ Kaolite-20. Base size—21′-9¾″ x 9′-9¼″. Temperature 1550 to 1600 F.	In service 11 years. Reducing atmosphere has no effect on the base. All portable annealing furnace bases in plant lined with B&W castables. *Maintenance costs reduced greatly.*
		Bell type covers lined with 9″ B&W K-23 IFB standard shapes in the arch, side and end walls. 13½″ K-23, with Kaowool, is used around the radiant tube openings. Cover is 22′-6″ x 10′-5½″ outside x 8′-4½″ to top of arch.	After approximately 6 years of service, lining showed no disintegration from reducing atmosphere.
65% CO	Radiant Tube Annealing Furnace	Base lined with 5½″ Kaocrete-A and 3½″ Kaolite-20 on top of 5½″ of block insulation. Base size 21′-9″ x 9′-9″. Temperature 1700 F.	Formerly heavy firebrick linings required rebuilding yearly. B&W castable construction has given more than 9 years' service. Customer standardized on B&W castables.
100% N_2 and 100% H_2	Elevator Type Annealing Furnaces Large Steel Co.	Walls lined with 9″ B&W K-23 IFB plus 3″ K-20 IFB. Furnace size 6′-0″ x 16′-0″ x 4′-0″. Temperatures in excess of 2100 F.	B&W refractories show no sign of deterioration in six furnaces of this type in 3 years' operation. Barring mechanical damage, refractories should give long additional service.
100% H_2	Rectangular Hood Type Annealing Furnaces	60 Furnaces, 24 have wall construction consisting of 18″ B&W K-26 IFB plus 2½″ K-1620 IFB. 36 units use wall of 9″ B&W K-26 IFB plus 5″ K-1620 IFB. Furnace size—12′-0″ x 8′-6″. Temperature 2150 F.	Of the 60 covers in service only 2 were rebuilt after 2 years' service. Plant masonry superintendent reports no shrinkage; estimates 15 years' additional life if not for mechanical abuse.

Consult your B&W Refractories Representative for helpful information on your prepared atmosphere problem.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 90 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide • B&W Ramming Mixes • B&W Kaowool

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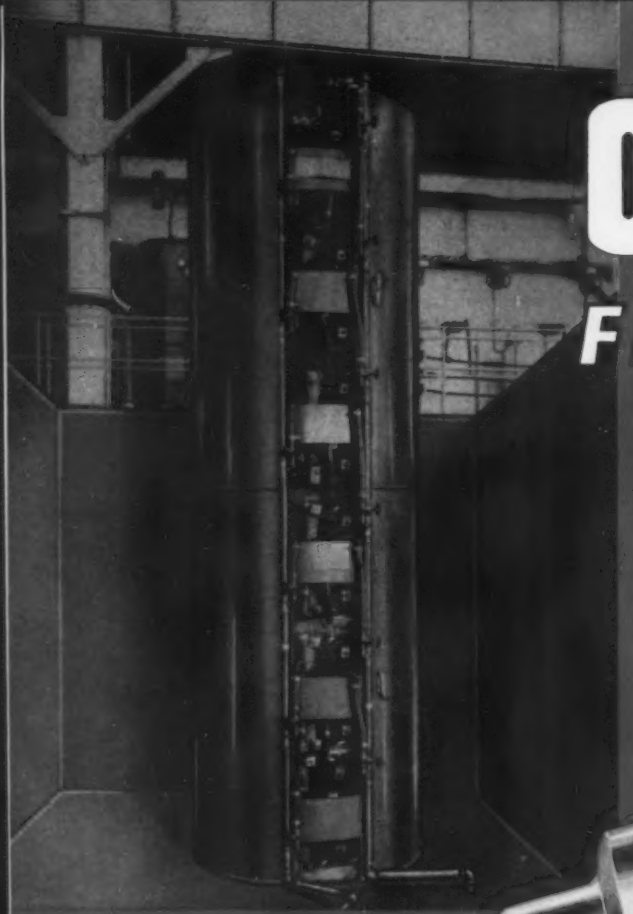

One of Ohio Steel's induction heating units used in removing original hardening and stresses from rolls to be rehardened.

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- Eliminates rebuilding and re-machining journals
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E. F. Liebrecht, elected president, Kellogg International Corp., London, and Societe Kellogg, Paris, subsidiary of The M. W. Kellogg Co., New York.

J. W. Lee, elected president and general manager, The Challenge Machinery Co., Grand Haven, Mich.

T. M. Ware, elected president, International Minerals & Chemical Corp., Chicago.

Maurice Schulzinger, named vice president, manager-Steel Building Div., Steelcraft Mfg. Co., Cincinnati; **David Liebman, Jr.,** to vice president, manager, Building Products Div.; **Frank Niesz,** to asst. secretary and works manager.

H. G. Knecht, appointed vice president, manufacturing and engineering, Stran-Steel Corp.

H. M. Bone, named board chairman and treasurer, and **A. D. Richardson, Jr.,** named president, The Ironsides Co., Columbus, O.; **J. R. McPhee,** vice president and general manager; **J. R. Barcley,** vice president; **R. C. Williams,** vice president, research and development; **H. H. Bone,** vice president, production; **B. G. Thompson,** vice president and **E. D. Stackhouse,** secretary and asst. treasurer.

A. H. Damon, appointed vice president, sales, Edgcomb Steel of New England, Inc.

Nevin Palley, promoted to senior vice president and **R. E. Galer** to vice president, engineering, Temco Aircraft Corp.

R. E. Schneider, elected secretary and treasurer, The Anaconda Co.

H. C. Cress, appointed vice president and works manager, Ford Instrument Co., Div. of Sperry Rand Corp.

R. T. Sullens, named controller, The Patterson Foundry & Machine Co., E. Liverpool, O.

H. R. Hiller, appointed asst. district sales manager, Chicago district, Harbison-Walker Refractories Co.

J. R. Killpack, elected comptroller, Ferro Corp., Cleveland.

W. D. Bickel, elected vice president and appointed general manager, Machinery Div., Dravo Corp., Pittsburgh.

Alexander Blake, appointed section head, theoretical and applied mechanics, Associated Spring Corp.'s Research Center, Bristol, Conn.

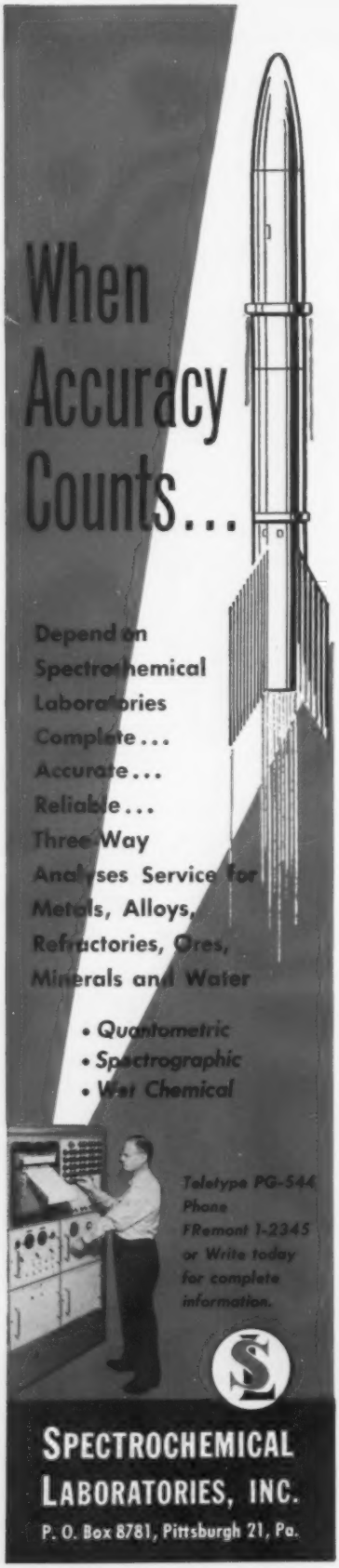
J. E. Carr, appointed manager, Industrial Div., The Oliver Corp., Cleveland plant.

W. C. McKee, appointed supervisor, internal auditing, Crucible Steel Co. of America, Pittsburgh.

J. V. Newman, named auditor, Dravo Corp., Pittsburgh.

S. S. Cathcart, elected vice president, Illinois Tools Works.

H. M. Bevans, appointed executive engineer, chassis, electrical and truck, and **W. R. Rodger,** named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chief engineer, vehicle testing, Chrysler Corp.'s Engineering Div.

R. D. Butler, appointed assistant to sales manager, plug valves, W-K-M, Div. of ACF Industries, Inc.

W. W. Weeks, appointed manager, power piping, Blaw-Knox Co.'s Power Piping & Sprinkler Div.

A. P. Shutts, promoted to sales manager, Becco Chemical Div., Food Machinery and Chemical Corp., Buffalo, N. Y.

R. E. Parrish, appointed superintendent, engineering and maintenance, Crucible Steel Co. of America's Park Works, Pittsburgh.

E. A. Reynolds, appointed manager, quality control, A. M. Byers Co., Pittsburgh.

J. H. Cuni, appointed vice president and director industrial relations, The Lodge & Shipley Co., Cincinnati.

C. M. Bankes, named manager, sales training, The Carpenter Steel Co., Reading, Pa.

J. H. Werner, appointed asst. sales manager, Lee Wilson Engineering Co., Cleveland.

Jack Searls, appointed general sales manager, Betz Div., Bohn Aluminum & Brass Corp., Danville, Ill.

E. F. Hill, appointed market manager, New Products Div., Wolverine Tube, Div. of Calumet & Hecla, Inc.

K. A. Vaughan, named manager, product applications, Industrial Div., Gould-National Batteries, Trenton, N. J.

J. A. Brinkman, appointed secretary and treasurer, The Lodge & Shipley Co., Cincinnati.

G. R. Smith, appointed sales manager, electric service works, Delta-Star Electric Div., Chicago,

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Ill., H. K. Porter Co., Inc.; **J. A. Schilpp,** appointed director, purchasing and traffic, Refractories Div.

C. F. Kucera, appointed manager, New York district office, Allis-Chalmers Industries Group.

D. E. McElroy, appointed manager, plastics research, International Resistance Co., Philadelphia.

John Winters, named sales engineer, Chicago sales office, Timken Roller Bearing Co.'s Steel & Tube Div.

K. W. Donle, appointed chief engineer, Tube Reducing Corp.

C. R. Bamford and **H. W. Baker,** appointed sales representatives, The Rapids-Standard Co., Inc., Grand Rapids, Mich.

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W. N. White, appointed sales representative, Greater New York metropolitan area, Wolverine Tube, Div. of Calumet & Hecla, Inc.

W. A. Ott, appointed controller, The Lodge & Shipley Co., Cincinnati.

D. L. Buttrey, appointed general manager, manufacturing, The R. C. Mahon Co., Detroit.

M. N. Burleson, named manager, aluminum can market sales, Reynolds Metals Co., Louisville, Ky.

E. R. Ross, appointed comptroller, Chrysler and Imperial Div., Detroit.

J. K. Beidler, named vice president, commercial, Dravo Corp., Pittsburgh.

H. B. Popp, appointed western sales representative, sub-contracts, Lycoming Div., Avco Mfg. Corp.

D. M. Marshall, appointed sales engineer, Fabricated Products Div.,

New high speed towboat . . . has power, will travel

The *Sally Polk,* first of the new Dravo-3200 towboats, was clocked at an average speed of 12.9 m.p.h. in trial runs with an 8500-ton petroleum tow. She is now in the New Orleans-St. Louis service of Canal Barge Company, Inc.

Another of these high speed 3200 horsepower towboats, the *Crescent City,* has joined the fleet of Sioux City & New Orleans Barge Line, Inc. Design features developed by Dravo during model basin tests in the Netherlands give the "3200" greater pushpower than other towboats of equal size and power.

A third Dravo-3200 is available for late spring delivery.

For more information on Dravo-3200 towboats, or other products and services, write DRAVO CORPORATION, PITTSBURGH 25, PA.

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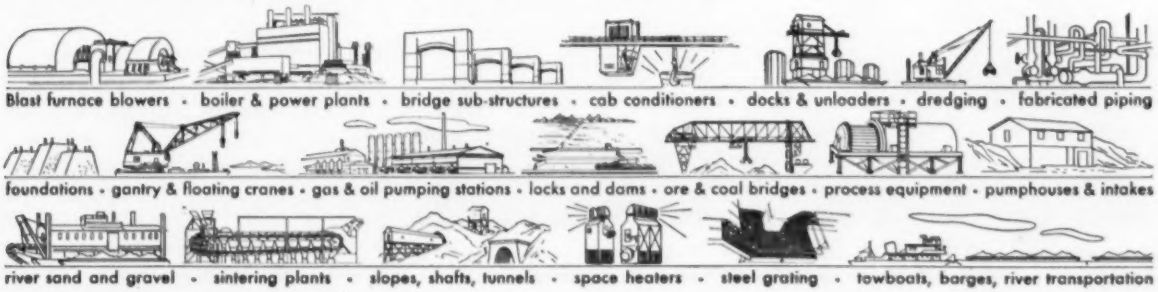
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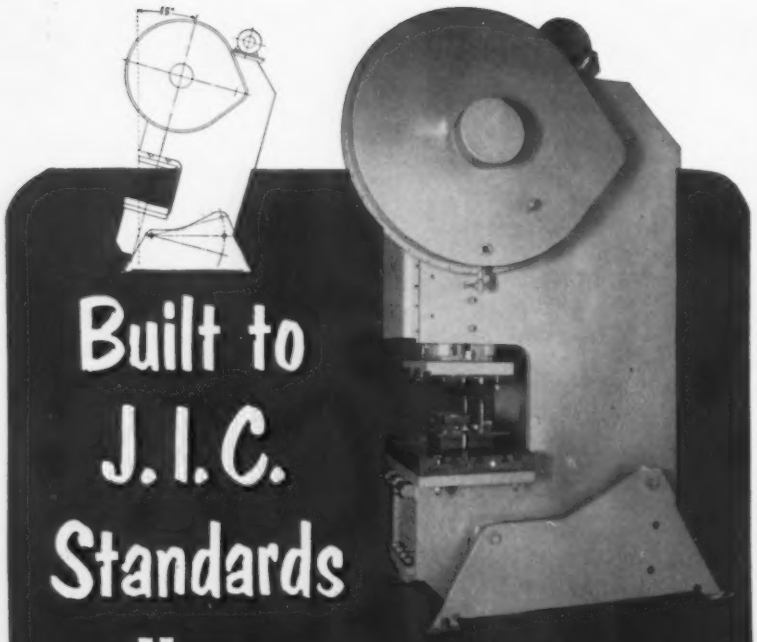

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Only a press which is completely new from top to bottom can meet the exacting requirements of Joint Industry Conference Standards. That is what you get in this new Oliver-Farquhar OBI Mechanical Gap Press. Sturdy full-length guides increase your tool and die life. J. I. C. bolster plates with J. I. C. T-slots and centers make it possible to change dies from one press to another without difficult adjustments.

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W. B. Yarnall, appointed vice president, engineering and construction, Edward Gray Corp., Chicago.

Clarence Dunlop, appointed vice president, manufacturing facilities planning, Burroughs Corp.

D. P. Minyard, named director, Industrial Div., Danville, Ill., plant, Electric Steel Foundry Co.

J. C. Guptill, appointed national product manager, Reinforcing Products Div., Joseph T. Ryerson & Son, Inc.

L. B. Kazmerowski, appointed production manager and **L. J. Pace,**

general production superintendent, Chrysler Corp.'s Delaware Assembly plant, Newark, Del.

O. C. Miller, named district manager, Buffalo sales office, The Timken Roller Bearing Co.'s Steel & Tube Div.

A. L. Stowe, named sales and service engineer, Springfield district office and warehouse, Vanadium-Alloys Steel Co., Latrobe, Pa.

G. K. Storin, named manager, customer technical service, The International Graphite & Electrode Div., Speer Carbon Co., St. Marys, Pa.

Henry Wohler, appointed staff engineer, Machine and Tools Div., Michigan Tool Co., Detroit.

J. C. Long, manager, publications, Bethlehem Steel Corp., will retire June 30, 1958. W. H. Jess, now asst. manager, will succeed Mr. Long.

F. S. Fitzgerald, appointed chief engineer, Adams Engineering Co., Inc., Miami, Fla.

A. W. McAbee, appointed asst. manager, sales, Plate and Structural Products Div., Inland Steel Co.

T. E. Read, named special field representative, The Pioneer Rubber Co., Willard, O.

R. W. Gregg, appointed to the sales engineering staff, Kaiser Steel's Montebello Fabricating Div. plant.

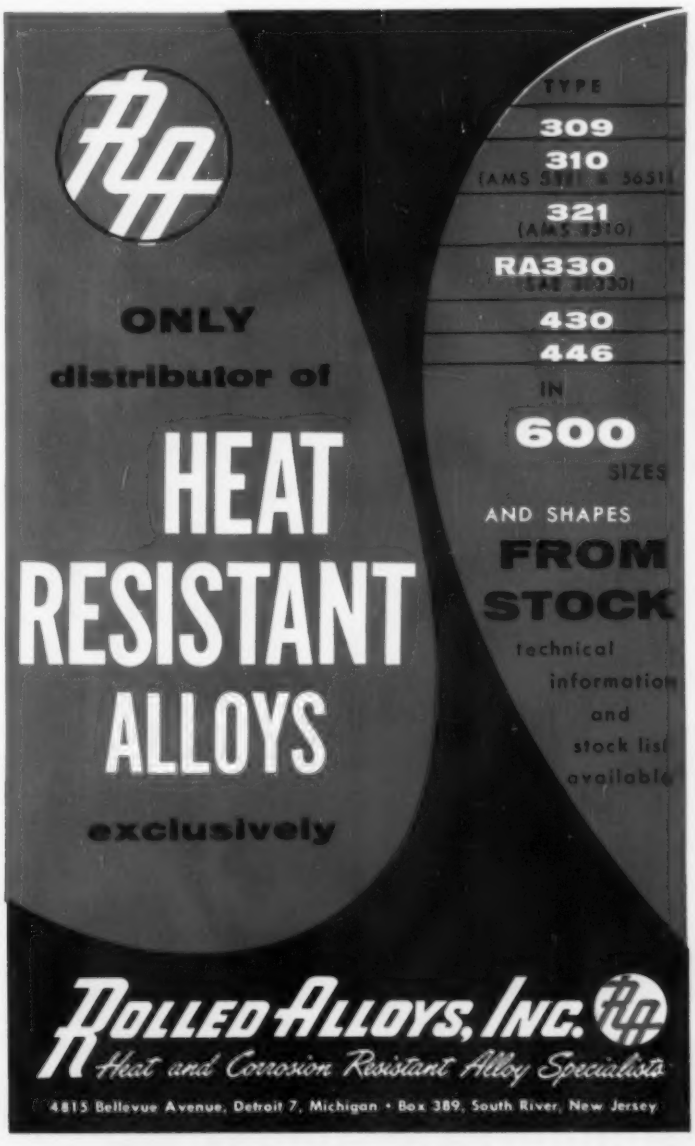
Norberto Voloshin, named chief engineer, Hirt Combustion Engineers, Los Angeles.

R. L. Kulp, named sales engineer, Reading Crane & Hoist Corp., Reading, Pa.

OBITUARIES

J. T. Dillon, 74, chairman of the board, Struthers Wells Corp., Titusville, Pa.

N. E. Burdick, president, Steel Equipment Co.



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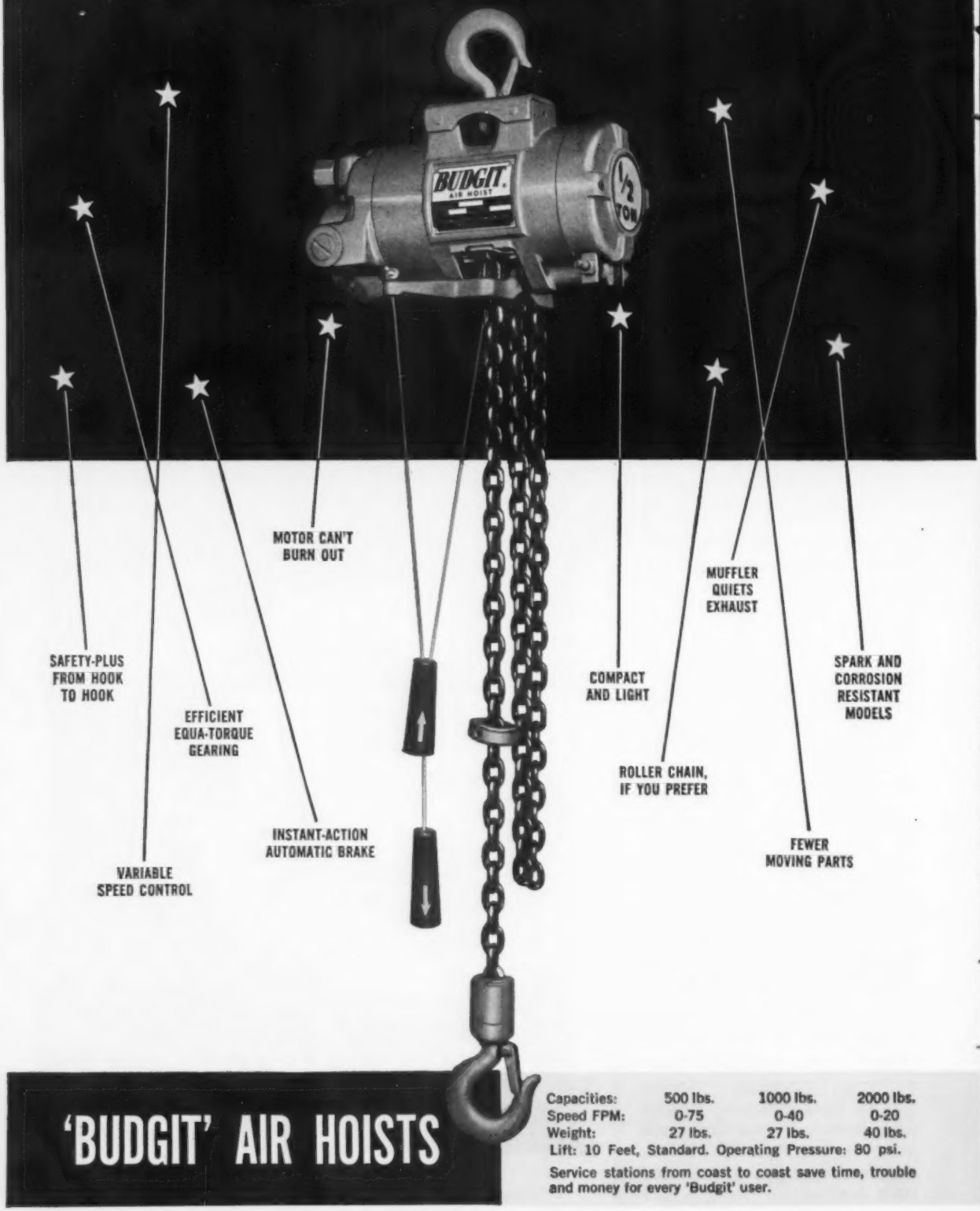

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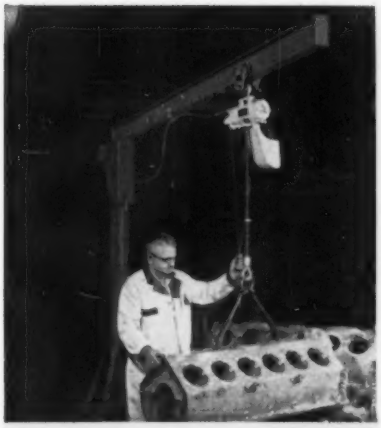

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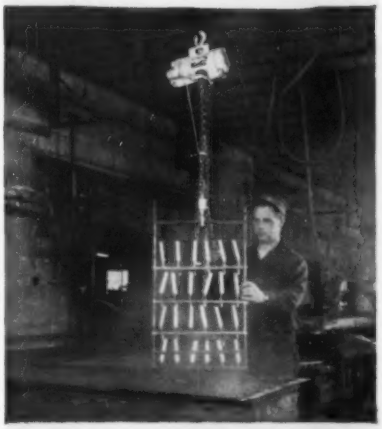
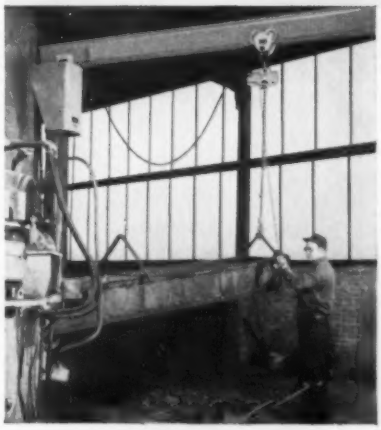


'BUDGIT' AIR HOISTS



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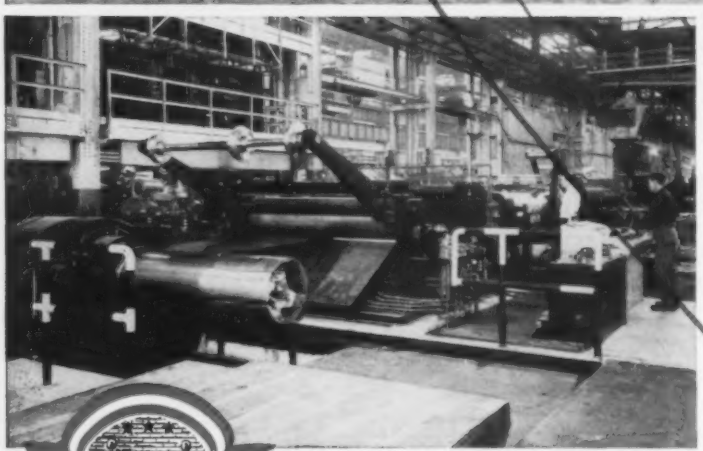

Photos show Stamco slitting and coiling unit in cold strip mill

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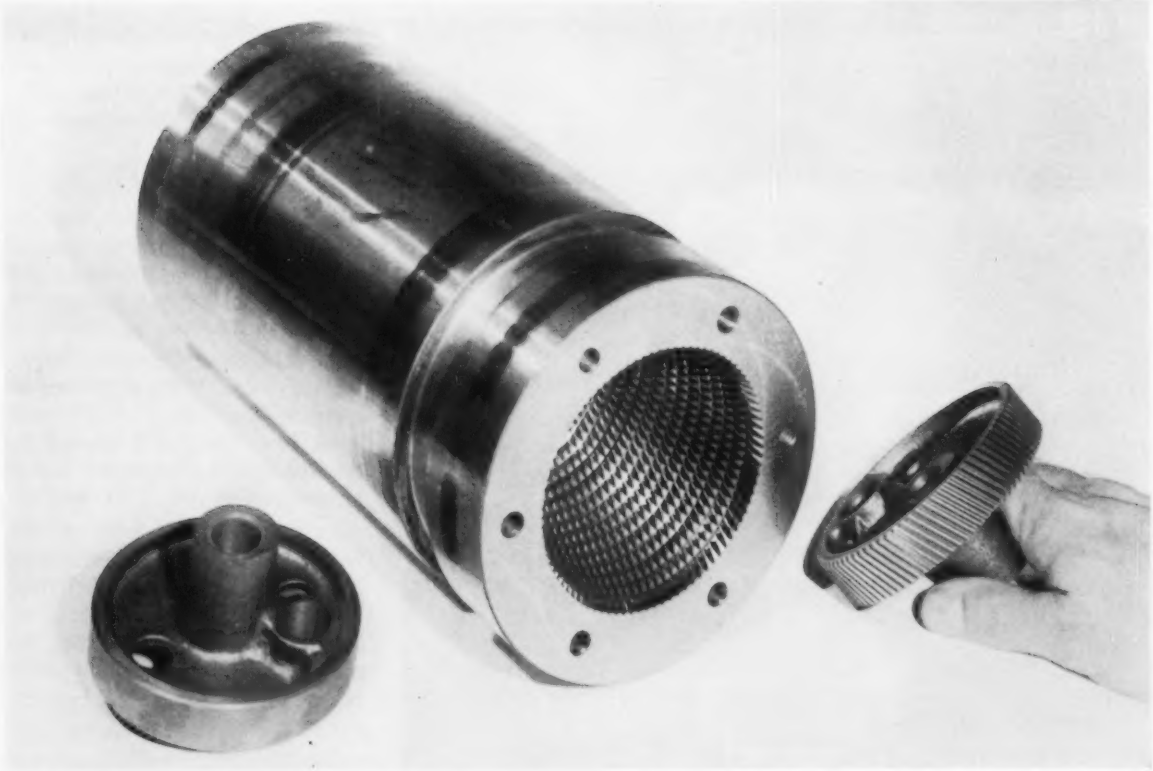


KEY TO SPEED: New type broach (center) converts cast iron blank (left) into a precision helical gear (right).

New Broaching Tool Cuts Helical Gears in One Pass

Big news in gear making is a broaching process that produces a finished helical gear in just five seconds.

Applicable to cast iron, steel, bronze and nylon gear blanks, it broaches teeth of exceptional smoothness and accuracy.

With this combination of speed and accuracy, the process appears to have vast potential.

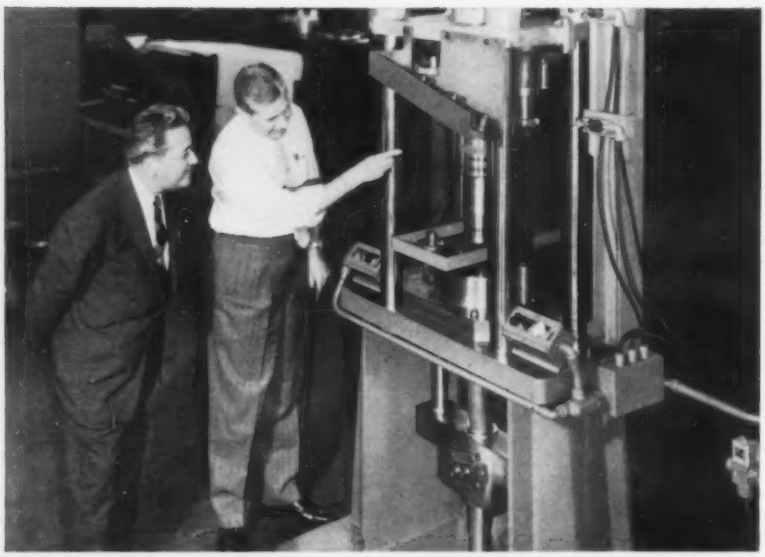
By R. H. Eshelman—
Engineering Editor

▪ A new broaching process aims to break all speed records for machining helical gears. Making use of a unique hollow broaching tool, the technique appears to be simplicity itself. You merely put a gear blank in a press, actuate the ram, and take out an accurate, finished gear after the tool makes just one pass. A few seconds is all it takes to do jobs that once took minutes.

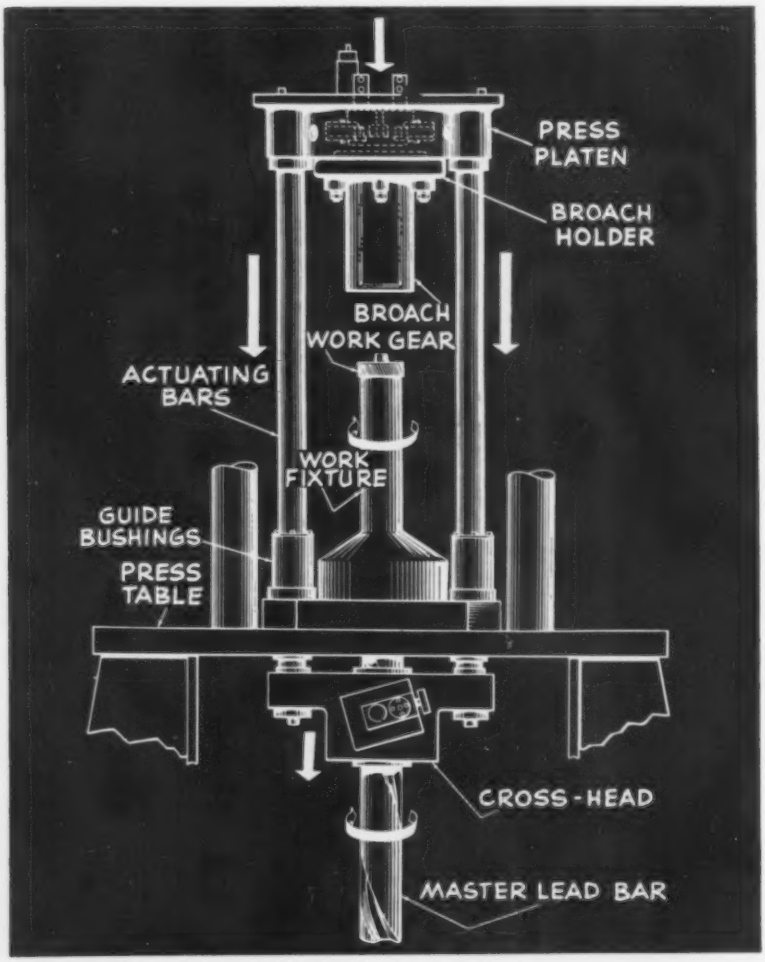
Credit this breakthrough in gear making to engineers of National Broach & Machine Co., Detroit. Its significance is tied to the fact that gear production is one of the major bottlenecks of manufacturing. Tolerances often are critical. Gear design demands precise mating with other gears, racks, and sectors. And functional requirements are high.

Production methods in the past have been accurate but costly in terms of equipment and technical manpower. Until recently, developments in this area have been evolutionary, scarcely keeping pace with the stepped-up demands of automated production. This new method of making gears, however, promises some changes in current concepts of gear production.

Tough Job—In the first applica-



FIRST ONE WORKS: National Broach's chief engineer, T. S. Gates (right), discusses trial setup with president Walter S. Praeg.



AUTOMATIC TWIST: The arrangement of the actuating bar and master lead bar rotates the gear blank as the broaching tool comes down.

tion, the new process makes a four-inch cast iron gear with 87 external teeth. The gear design calls for 24-pitch, a 22° helix angle and a ¾-in. face. It's a regular production gear, ordinarily hobbed in quantity by a leading washing machine manufacturer.

In Production Now — For the trial setup, engineers picked a 25-ton hydraulic press of the vertical type. The first broach was installed in this because of the flexibility it afforded. It worked at once, with little adjustment, requiring only a shot of coolant of the usual lard oil and kerosene variety. The first of these new broaches is already in operation in the appliance manufacturer's plant.

In the production setup on this cast-iron gear, the actual cutting cycle is a mere five seconds. Total floor-to-floor time is only about 15 seconds, including hand loading. By contrast, up to five minutes would be needed to make the gear by present generating or shaping methods.

Key to the success of this achievement, is the design of the one-foot long broach. It's made of high speed steel, and produced of a single piece. Its thousands of broaching teeth are ground from the solid stock. Techniques of the ultra-precision grinding operation are a carefully guarded trade secret.

How It Works—To broach the helical gear teeth, the blank must be rotated in careful coordination with the downward motion of the broach. To do this, the head supporting the broaching tool is geared to the workholding fixture. The arrangement uses a unique actuating bar, cross head, and helical master lead bar. Room for these components must be provided in the bed of the press.

When the broach advances down over the workpiece, the lead bar turns the work by means of the two precision helical flutes. These engage internal tooth members in the fixed guide bushing of the cross-head member.

Precision ball bearings in the work fixture post insure accurate

rotation of the part. After the broach has passed over the workpiece, it rises to its starting position, carrying the finished gear with it. At the top of the stroke, an air cylinder ejects the part to a position at the front of the broach head. From there the finished gear drops into an ejection chute.

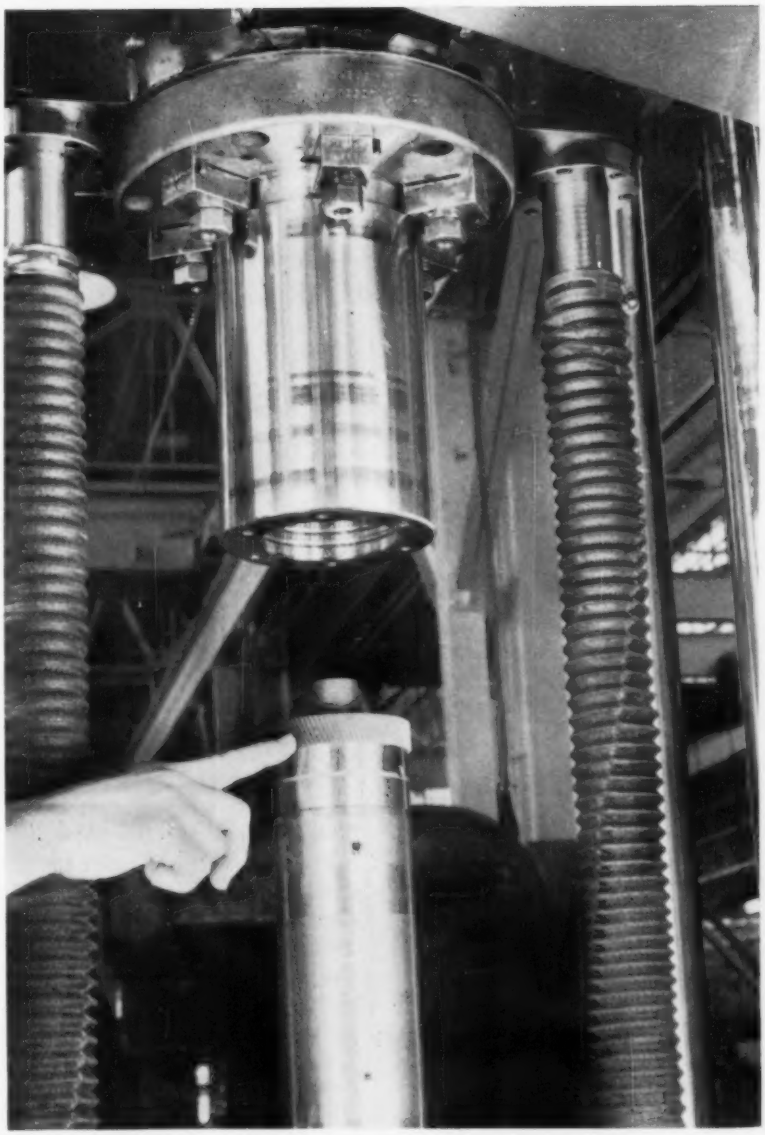
Much To Learn—It's still too early to say what the full potential of this process may be. One apparent advantage is that it may be adaptable to a wide range of presses. The fact that a relatively small 25-ton press permits broaching 0.087-in. deep gear teeth in cast iron is indicative, however. Little equipment may be needed to adapt the process to existing facilities in many plants.

In further tests the company has broached both bronze and plastic gears with the same tool developed for the cast iron gears. All have the same smooth tooth surfaces.

Gives Finish Accuracy — How accurate are the gear teeth produced by the new process? In the tryout period National Broach turned out 10 test gears for the manufacturer to inspect. The report showed a maximum tooth pin size variation of only 0.0009 in. Maximum variation in lead on both sides of the teeth checked to 0.0008 in. And the maximum involute profile variation was only 0.0003 in.

When they checked with a master gear on a rolling fixture, inspectors came up with a total indicator reading for runout of less than 0.001 in. Because tolerances are held so closely, the washing machine manufacturer plans to use these gears as broached, without further finishing.

Future Open—National Broach president Walter S. Praeg says, optimistically, "We anticipate a great future for the new external gear tooth broaching process because of its cost-cutting possibilities coupled with its inherent high accuracy. But length of the broaching tool is a limiting factor as far as accuracy and production feasibility are concerned at this time."

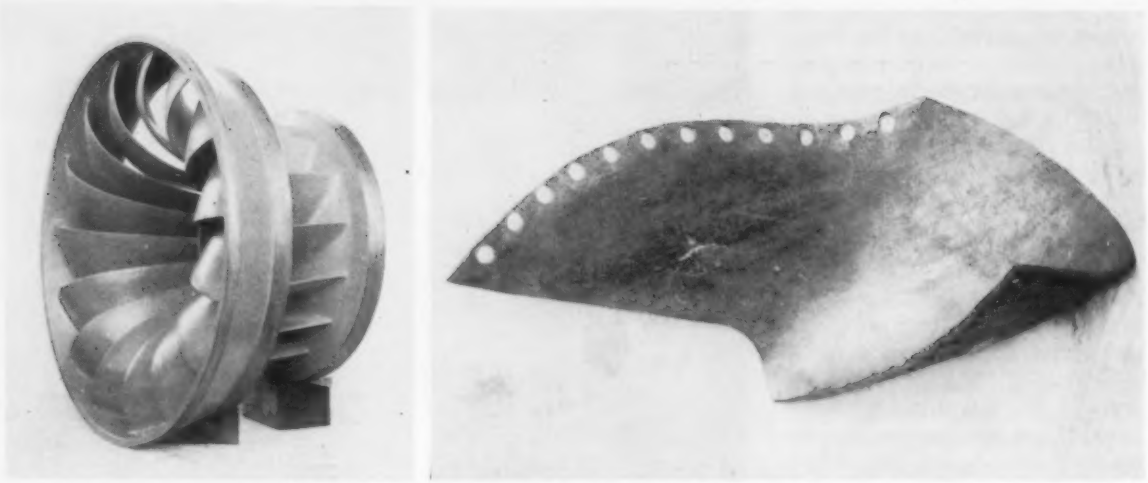


STREAMLINED TOOLING: Because the broaching tool lifts the finished gear from the workholding fixture and ejects it automatically at the top of the press, the gear never does appear in the position shown.

To broach gears of coarser pitch and greater depths, however, the firm's engineers envision use of two or more broaches in progressive sequence. They feel sure this approach can extend the range of applications.

Chief Engineer T. S. Gates reports that, "Steel gears seem to pose no special problem for the process at this time." He reveals that several such applications are now in the design stage. External spur gears, sprockets and clutch parts, as well as sintered powdered metal toothed parts are ideal applications for the process, he feels, explaining that the helical gear represented the toughest problem—and it's already licked.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



COMBINED METHOD: Wrought iron insert (right) is preformed with punched holes that key into casting (left).

Inserts Simplify Rotor Casting

Keep casting design simple and you can hold costs down.

One maker gets his complex shape by casting around preformed plates.

▪ A one-piece unit can be the answer where long-term service is specified. Such is the case with hydraulic turbine runners. Here's how one manufacturer, The James Leffel & Co., Springfield, O., casts runner buckets into a hub and band of cast iron.

The runner buckets are cut to a template from low carbon steel plate, wrought iron, or stainless steel. Holes, punched near the periphery where the buckets project into the hub and band, act as a key to anchor the buckets. Forming the bucket is completed including shaping the inlet and discharge edges.

Rig Provides Spacing—The runner buckets are set on a wood pattern and secured in a metal runner rig with the buckets bottom side up. The setup provides accurate bucket spacing, correct discharge and inlet angles, and discharge area.

A cast iron core setup plate is bolted to the rig on a dowel fit. The assembly is placed on a wood false bottom with flask rings bringing the mold height just above the rig.

Facing sand is placed on the pattern and molding sand is rammed around the buckets and rig to fill the mold. A true bottom is then attached to the mold and it's gently rolled bringing false bottom to top.

The flasks are stripped off and sand is peeled from outside the rig. The rig is lifted off leaving the buckets securely anchored in the sand with wood hub pattern and core setup plate in place.

A center pole is attached to the top of the hub with a sweep arm placed around the pole. A sweep bar, set on the arm at a given angle, makes contact with the dowel in the core setup plate at the bottom of the mold. Mounted on the bar is a sweep block with detachable finger bars.

Expose Punched Holes — By rotating the sweep assembly, the inside band shape is formed to expose the punched holes in the buckets. The band section is given a plumbago wash and torch dried.

Band cores providing the outside band shape are set against the mold and on the core plate. Then the flask is returned to place. Molding sand is rammed to secure the band cores, gates and risers, filling the mold to a level slightly above the wood hub pattern.

Cope Forms Access—A cope is rammed on top of the mold to form the top shape of the hub and the access for cast iron to flow into the gates for feeding both the band and hub. Risers and vents are also worked into the cope.

With cope lifted, the wood pattern is then removed. Fillets are cut in the sand adjacent to the buckets which become exposed below the punched holes. The mold is washed with plumbago and dried. A center core is set in the mold.

The cope is replaced with the center core fitting into its print hole. The flask rings are bolted and center core weighed down.

Cast iron from the cupola is poured from a ladle into the runner box in the cope feeding the band and hub. The gases find free access through risers and vent holes until the pouring is ended with the cast iron up in the risers.

Electromagnetic Test Measures Effects of Shot Peening

By P. M. Unterweiser—Metallurgical Editor

If you're shot peening production parts, you're probably banking on fatigue tests to guide your procedures.

Fatigue testing can be mighty expensive. Here's the Russian substitute — a simple electromagnetic test that claims to be just as dependable.

▪ Shot peening can't overcome all of the flaws of poor design or sloppy machining. But with many metals, it can improve fatigue life, cut polishing costs, increase oil retention properties, minimize stress corrosion failure.

In fact, the list of advantages that can be derived from shot peening continues to grow longer every year.

This is the bright side of the picture. There is a somewhat disturbing side, too. It has to do with measuring the effective depth of the layer of metal compressed by shot peening.

Blind Item—This is all-important in terms of fatigue improvement. For it is this layer that ultimately determines the bulk of shot-peened properties. Unfortunately, it is knowledge of this layer that remains pretty much a blind item—short of expensive fatigue testing.

Thanks to recent research, this troublesome blind spot may be transformed to a handy measure of control. Two Russian scientists, N. A. Petrova and M. Y. Shashin, have experimented with a nondestructive method that determines the depth of compressed layer and also measures the quality of shot peening. Their technique is based on the changes in electrical and magnetic properties that result from the plastic deformation found in the compressed layer. It can be applied to magnetic materials only.

Important Layer—The depth of compressed metal is important for a number of reasons. On the positive side, there is a correlation between improvement in fatigue strength and depth of plastically deformed metal. But as W. W. Safee points out (The IRON AGE, Mar. 1, 1956, p. 78), even effective peening cannot restore the fatigue life of a notched surface to that of a comparable surface without a notch.

Even more important is the fact that it is entirely possible to overpeen. In an attempt to obtain maximum peening effectiveness, it is possible to so abrade the surface as to cause a lowering of fatigue strength.

Stress Intensity — To provide some measurable control, conventional peening practice prescribes determining effective peening intensity. This refers to the effect of a blast of shot on the work being peened. According to J. C. Straub of Wheelabrator Corp., "it is dependent upon the potential peening intensity of the blast and the angle of impact of the shot on the work, and is measured as arc height at full coverage."

Unfortunately, the measurement of arc height is an indirect measurement, having only a partial relationship to the effect of peening on the work. By definition, arc height is a measure of the curvature of a test strip which has been peened on one side only. It is measured by the use of Almen test equipment.

Measure Arc Height—The so-called "Almen strip" is a thin (0.0510 in. thick) strip of hardened (Rc 44-50) steel. For test purposes, it is clamped in a holder and exposed to the shot stream. Compressive stresses build up on the exposed side of the strip so that, when it is removed from the holder, it assumes a curved shape.

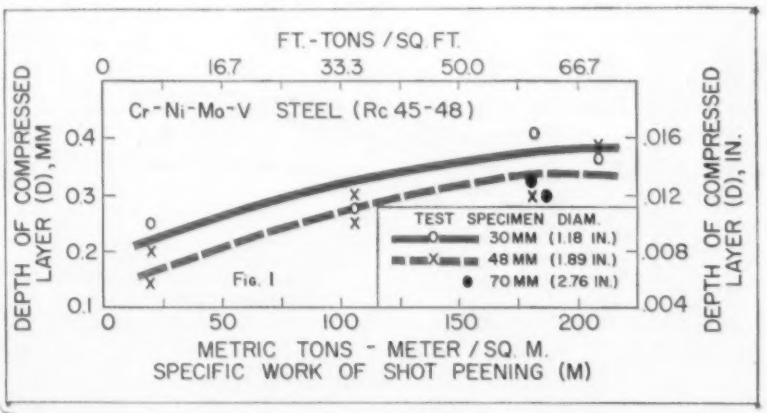


FIG. 1: Depths of compressed layer are shown for three bar sizes of a Cr-Ni-Mo-V steel hardened and tempered to Rc 45-48.

The extent of curvature is referred to as "arc height" and is measured with a special height gage.

Before peening, the Almen strip is flat, rectangular, and of uniform thickness. The work, on the other hand, may be largely curved, of irregular shape, and of varying thickness.

Big Question—The Almen strip is made of plain-carbon steel hardened and tempered to Rc 44-50. The work may consist of any type of steel with a hardness that may fall below or exceed the hardness limits of the test strip.

In the face of unlimited variables, what does an Almen strip really measure? All it does is provide a simple means for duplicating a peening intensity that has already been established on a specific part. Just what the peening intensity contributes to fatigue life must still be determined by fatigue tests.

Specimens vs. Parts—To further complicate matters, fatigue tests are usually conducted with standard fatigue specimens—not production parts. How close a correlation exists between the results obtained with a test specimen and the actual properties of a production part is often a moot point. So that—to some extent—anticipated improvement in performance of a production part must be based on assumption, not direct measurement.

The team of Petrova and Shashin has not solved all of these problems nor mastered every possible variable. Their test method is admittedly not original.

But by further extending finite measurement, they have side-stepped a lot of disturbing assumption. Equally important, they have demonstrated the validity of nondestructive, electromagnetic measurements as means for determining major effects that result from shot peening magnetic materials.

Recognizing that it is difficult to obtain definite knowledge of fatigue strength by service tests, the Russian scientists return to the standard of measuring the thickness of the compressed metal layer.

Under certain limited conditions, this can be handled by making a microhardness survey of a transverse micro-section. An X-ray diffraction analysis of the stressed material or a measurement of the extent of deformation may also be used in some cases. But electromagnetic measurements have the advantage of being both non-destructive and far more versatile.

Because shot peening produces a rather shallow strain-hardening effect, the sensitivity of electrical induction measurement can be increased by using an alternating current field at sonic frequency. In their tests, the Russian scientists provided maximum current density to the "zone whose depth is commensurate with the depth of strain hardening."

How It Works—Measurement is obtained by measuring "the self-inductance of the coil in the transducer." This coil, in turn, is linked into one of the arms of a resistance bridge. "The bridge is balanced against a standard specimen. The unbalance produced by the object investigated is a characteristic of the strain hardening of its surface layer."

The Russians claim three advantages for electromagnetic measurement. 1) It can be applied to both hard and soft steels. 2) It can be used as a routine method to check shot-peening quality once "calibration curves correlating the thickness of the strain-hardened layer with the readings of the instrument" are available. 3) It can determine optimum peening conditions for a given part before the part is put into production.

Checks Out—The first requirement for any test method is that it be valid and reproducible. The Russians have checked electromagnetic measurements against both microhardness results and X-ray analyses. They have experimented with a variety of shot-peening intensities on similar and dissimilar steels at various hardness levels. They are well satisfied with the close correlation of test results.

In all of their calculations, the Russians refer to a system of symbols which requires some explanation. They represent the depth of strain-hardened layer by the letter "d" or the Greek delta. This depth is dependent upon what they call a "generalized parameter, M."

About "M"—The quantity "M" represents the specific work of shot peening and can be derived by a calculation involving such variables as shot speed, intensity, angle of impingement, and peening time. The system was developed by Petrova, Shashin, and Volynkin in 1955.

In American practice, it is common to plot improvement in fatigue

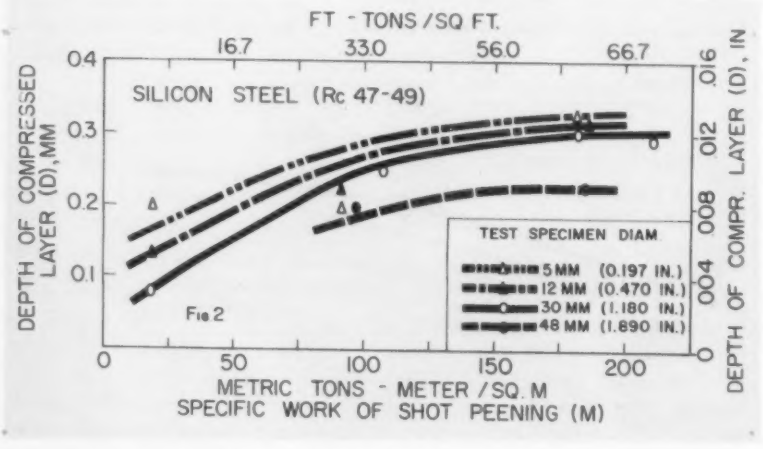
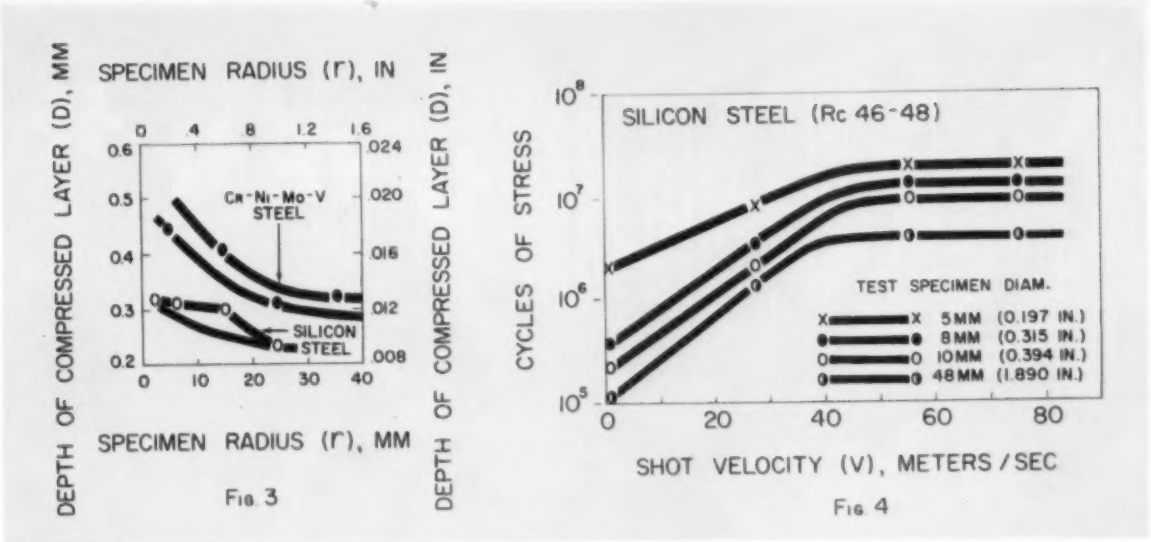


FIG. 2: Four curves indicate the depths of compressed layer obtained with different bar sizes of a Russian grade of silicon steel.



FIGS. 3 & 4: At left (Fig. 3) is plotted the effect of specimen diameter on depth of compressed layer for two grades of steel. Fig. 4 indicates how it is possible to determine in advance the optimum peening conditions for a known grade of steel of given hardness. Information is based on electromagnetic measurements.

life as a function of peening intensity and stress level (psi). The Russians take a different approach. Their system plots depth of compressed layer (d) vs specific work of shot peening (M). Consequently, it is difficult to translate Russian values into American fatigue standards and vice versa.

Other Differences—The Russian system for the direct plotting of fatigue improvement is also different. To begin with, they indicate peening intensity by the symbol "V", which is a measure of shot velocity in meters per second. Fatigue improvement is shown by plotting cycles to failure vs shot velocity or intensity. Stress values are omitted.

Their system for plotting depth of compressed layer can be seen in Figs. 1 and 2. In both cases, the diameters of the specimens peened are shown. There is no indication of the shot size used, although this factor is presumably incorporated in the "M" values, or specific work of shot peening.

On both charts, a maximum depth of compressed metal layer appears to be reached at an "M" value of about 150 tons. Beyond this point, the curve levels off for both the Cr-Ni-Mo-V and silicon steels. Further peening would not result in additional fatigue improvement.

Electromagnetic measurements make it possible to determine this optimum peening level without resorting to elaborate testing.

Diameter Counts—Of particular interest is the information shown in Fig. 3. This chart demonstrates the effect of specimen diameter on depth of compressed layer under identical peening conditions. As the diameter increases, depth of hardening decreases. This tendency becomes less pronounced and gradually levels off with diameters of 2 in. or over.

It is the opinion of Petrova and Shashin that this gradual decrease in depth of compressed layer stems from the increase in tensile stresses in bars of larger diameter. A higher level of tensile stress is capable of negating the induced compressive stresses to some extent. Once a critical diameter is reached, effect of residual tensile stresses levels off and compressed layer depth becomes more or less constant.

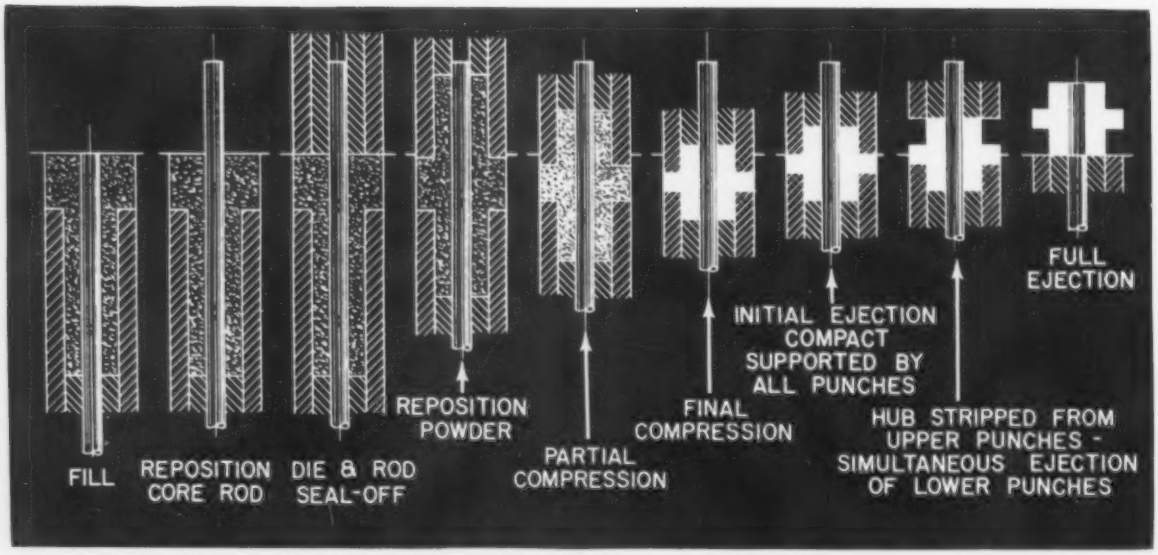
Shop Application—The practical application of electromagnetic measurement is shown in Fig. 4. Here the maximum depth of compressed layer for various diameters was determined for a silicon steel with a hardness of Rc 46-48. With this information, according to the Russians, it is possible to specify optimum peening conditions and estimate fatigue life without running fatigue tests. It is claimed that the results shown were actually confirmed by service tests.

Granted that some of these claims are difficult to accept without question, it is obvious that electromagnetic measurement has a lot in its favor. Any likely substitute for fatigue testing warrants careful appraisal. If it can be safely adopted, savings in laboratory test time alone should be impressive.

ACKNOWLEDGMENT

The editors would like to thank Mr. Henry Brutcher, Altadena, Calif., for permission to quote from his translation (No. 4024) of the Russian paper "Depth of Strain-Hardened Layer Produced by Shot Peening" by N. A. Petrova and M. Y. Shashin.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



CLOSE PROCESS CONTROL: Servo mechanism controls punch motion through each step of proportional pressing and simultaneous ejection. The several lower punch carriers move together to eject parts.

Complex Powder Metal Parts Call for Higher Density

By **S. Bradbury III**—Powder Metal Press Div., F. J. Stokes Corp., Philadelphia, Pa.

As powder metallurgy progresses from simple parts of low density to more complex shapes of higher density, pressure and control factors become more critical.

New press units can cope with these factors with simplified tooling.

▪ There's a trend to more complex shapes at higher uniform densities in powder metal parts. The demand calls for densities in the range of 7.3 to 7.5 g per cc, an increase from the average requirement of 6.5 to 6.8. It's a way to get better physical properties, higher tensile strength and crush-resistance.

Because metal powder has very little plastic flow while being compacted, complex shapes require differential motions of separate tooling members. For relatively short runs in medium density, it can be done with spring-loaded or cam and latch tools. But at higher densities, such tooling cannot be relied on.

Add Punch Motions—It has led to the design of large-tonnage presses with three or more individual punch motions. Some offer as many as six motions.

These larger presses are equipped with flexible stroke control. Each lower punch can be adjusted for its fill, compression, and ejection position, with each upper punch adjusted for its compression stroke.

With these multiple motions hydraulically or mechanically actuated, the tooling can be kept relatively simple and inexpensive. It provides a two-fold economy: lower tool cost per piece, and higher press utilization with less down time for setup.

Use Stop Rods — Control over the motions of the press is usually provided by threaded stop rods. Some presses are equipped with indicator dials reading in five digits to show the position of the stops to a thousandth of an inch. This feature speeds setup and adjustment of the press and its tooling during the trial period.

One refinement in the design of multiple-motion presses, called proportional pressing (The IRON AGE, Dec. 26, 1957, p. 56), was introduced recently by F. J. Stokes Corp., Philadelphia. In proportional pressing, each lower punch moves at its own rate of travel from fill position to arrive simultaneously at final compacting position.

Powder density throughout the part increases uniformly during compacting.

In the new 300-ton Stokes multiple-motion hydraulic press, a servo mechanism performs proportional pressing by sensing the movements of the platens which carry the two lower punches.

Ejects Part Intact — Once the "green" compact is made, it must be removed from the die without fracturing. The several lower punch carriers are locked together in their final position, and move upward together to raise the part out of the die.

As each punch reaches the top surface of the die, its upward motion stops. When the part is completely free of the die, it can be safety ejected.

In some cases, additional support for a weak compact is provided by allowing the upper punches to remain in contact with the part during the ejection cycle.

DESIGNED FOR SIZE: With proportional pressing, 300-ton Stokes hydraulic press turns out parts as large as 10-in. diam, weighing 8 lb. Tooling can be kept relatively simple and inexpensive.

Special Tools Machine And Assemble Gear Components

By Herbert Chase—Consultant, Forest Hills, N. Y.

Many metal parts appear to be simple to make. But appearances can be deceiving.

For one thing, close tolerances can transform "easy" jobs into difficult cases.

Here's an example: a transmission part that calls for many special tools and setups.

■ Parts that appear relatively simple to produce often turn out to require unusual setups, special tools and, in some cases, special machines. One such workpiece is a carrier assembly front planet ring gear, an important component of one of the latest Buick Dynaflow transmissions.

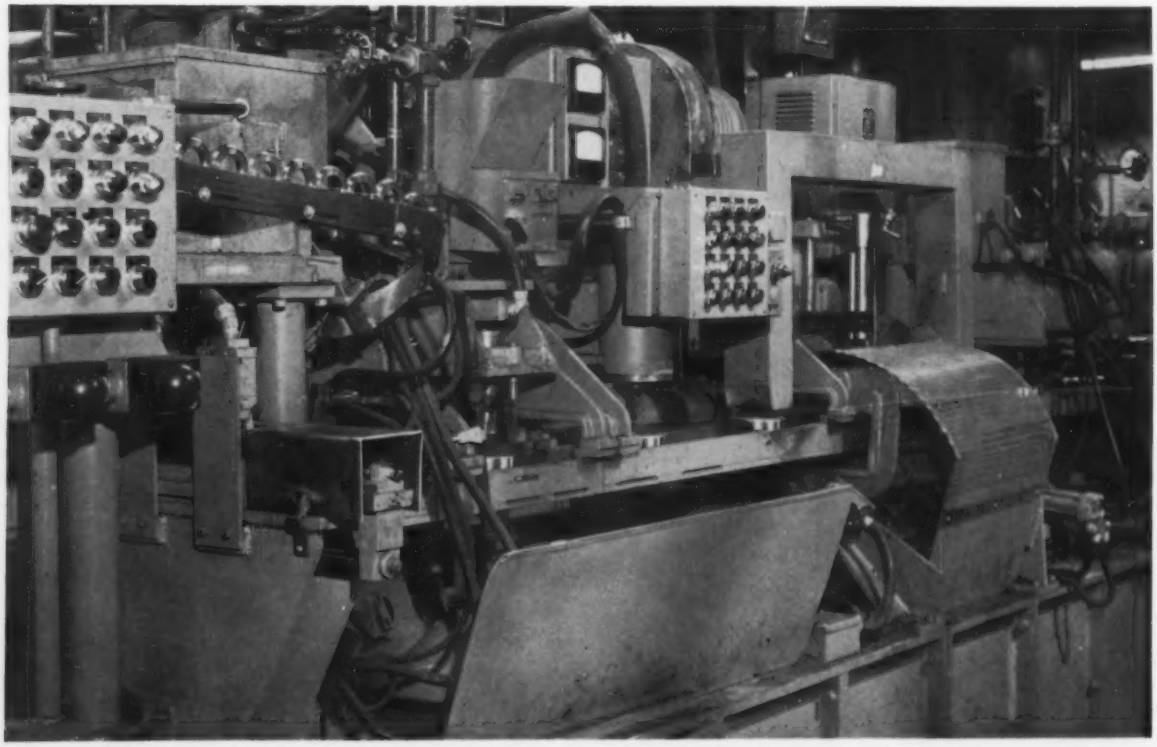
The major workpiece is a cup-shaped stamping with stepped sidewalls which must be drawn hot, using 0.180-in. thick SAE 1070 steel. The full assembly requires a hub to be circular arc welded to this ring gear stamping.

Each stamping received from the vendor has a rough-machined central hole at the point where the hub will eventually be welded into place. Stampings are carefully gaged and checked for hardness before they are delivered to a battery of three HEB Pilot lathes for the first machining operation.

The workpieces are loaded into a magazine and thence into a rocking holder. From this point they are positioned over a wedge operated chuck that centers the workpieces at 12 separate points.

Four Separate Cuts—There are four tools in each lathe. The one in the lowest position faces the front end and contours the outside diameter. The uppermost tool roughs the inner end of the part. An intermediate-position tool forms the outer end, and the fourth faces the hub recess and bores and chamfers the hole.

Each tool follows a template which is set in an indexing holder above the work. All cuts are made



ON THE WAY: Loading end of 10-station transfer machine brings hubs and stampings together for assembling.

at about 400 sfpm, and one man tends all three machines. Unloading is automatic.

Workpieces are transferred next to one of two Cincinnati centerless grinders where a plunge cut with a three-step wheel brings the OD to finished size. Here, also, one man operates both grinders and does all the required post-operation gaging.

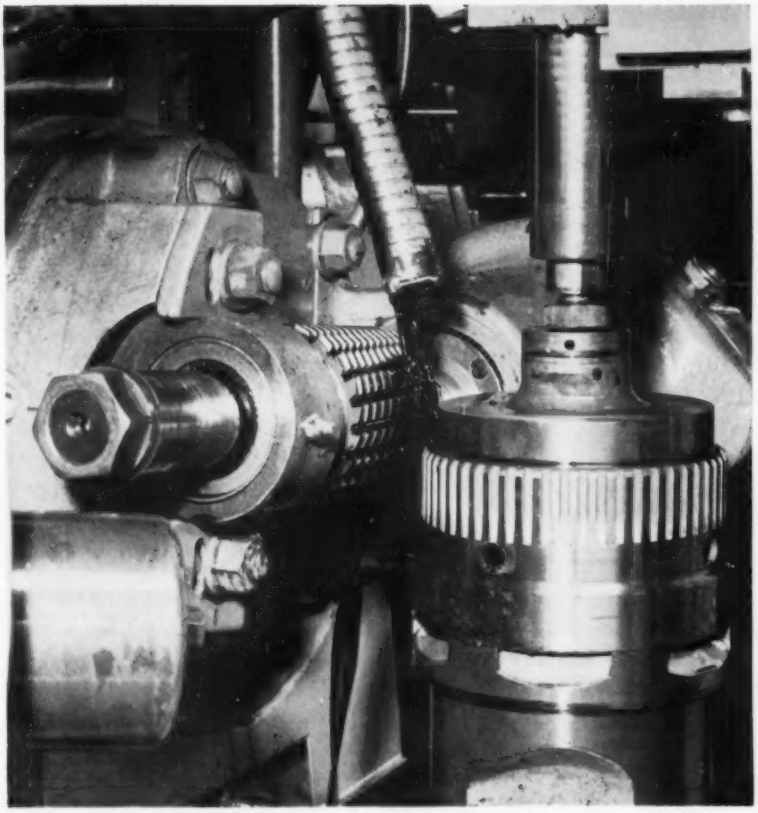
Holes Are Pierced — Ground parts move on to a special Inter-Lake hydraulic press which pierces four ½-in. diam holes at 90° intervals around the side wall and through its central land. Holes are pierced outwardly for easy burr removal. The four punches operate in quick sequence by a wedging action of the press ram after the workpiece is clamped in a combination die and fixture.

Workpieces feed into punching position from a hand loaded, chute-like magazine. After the holes are pierced, the part is elevated and pushed into a discharge chute by the piece immediately following. All pierced parts are then washed clean of oil, grease and foreign matter to prepare them for the hub welding operation.

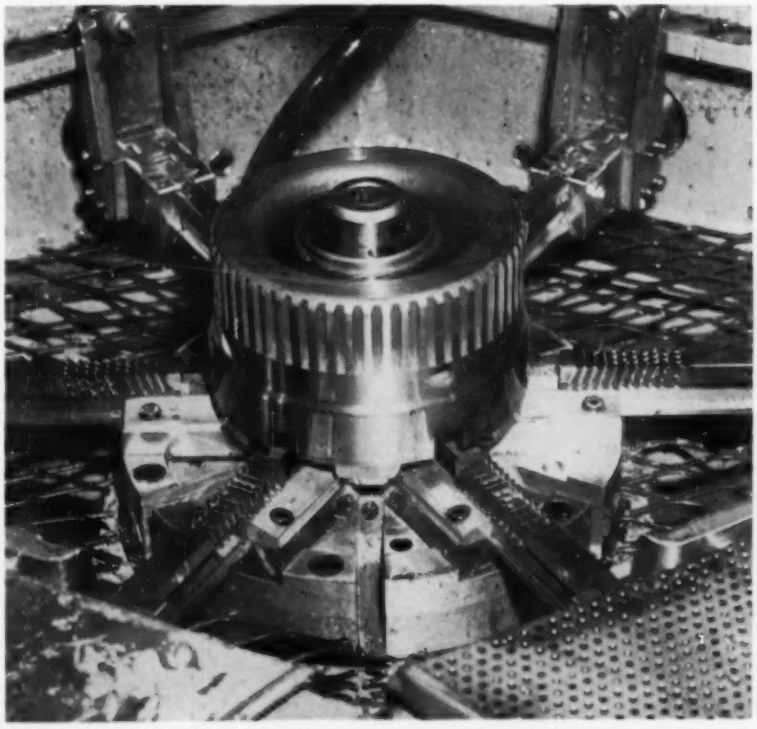
Hub blanks are rings of SAE 1041 steel supplied in a heat treated condition. They measure 2.5 in. OD, have a central hole finished to 1.436-1.439 in. in diam, and are 0.515-0.525 in. thick. They go to a two-spindle Excello machine which turns the hub OD, faces the end, and chamfers the outer end of the hub hole. Rocking arms feed the blanks in for chucking and also pick off finished parts, depositing them in a chute for transfer to a washing machine.

Ten-Station Welder — At this point, washed hubs and drawn parts are conveyed automatically to magazines which feed them to an Expert 10-station transfer welding machine. Before welding, the hub is pressed into the drum-like stamping and both pieces are induction heated to between 500° and 600°F.

Next, a Lincolnweld head, feeding both wire and granular flux,



NEXT MOVE: Three 8-spindle hobbing machines produce external splines on the smallest OD of the hot-drawn workpiece.



FINAL BROACHING: Finish cuts on slots around rim of assembly are made by six broaches, arranged radially, which move outward.

automatically makes the circular-fillet type submerged arc weld. The weld bead is in the corner formed by the hub OD and the outer face of the drawn part.

Subsequent stations pick up the unused flux, jar the fused flux loose, cool the weldment by the air blast and then reheat it by induction to stress relieve it. Parts cool slowly in a discharge chute before they receive additional machining.

More Machining—Weldments go next to a two-spindle New Britain Cam-Neumatic where they are hand loaded and chucked on the previously ground OD. Throwaway carbide tips then bore the hub, and face and chamfer both ends and face the outer end of the drum. This brings the work to finished length.

An 8 x 15-in. Fay lathe then turns the outer hub OD and chamfers the edge, after the piece is hand loaded on an expanding arbor. These operations, which include removal of any excess weld metal, are performed by the same man who tends the New Britain machine.

An American broach, equipped with a self-indexing table having holders for four pairs of parts, then broaches internal splines in the hubs. Two combination round-and-involute-spline pull broaches feed simultaneously at each stroke of the ram.

Hob External Splines—External splines are hobbed next on three eight-spindle Cleveland hobbing machines. One man tends all three units, loading and unloading workpieces by hand. Each machine has eight 3½ x 4 x 1¼-in. hobs.

An Osborn Brushmatic machine then removes all burrs from the outer splines. It uses two 12 x 2-in. wire brushes which turn in opposite directions. They are applied first to one side of the workpiece and then the other. Parts feed into the brushes by means of a fixture that rotates slowly. Loading and unloading are done by hand.

The next operation is the semi-finish broaching of six equally-spaced slots (each 0.602-0.606 in. wide) at the open end of the front planet ring gear. Slots are broached on three sides, undercut at the inner corners, and chamfered at a 45° angle to an 0.030-in. face in the outer corners. A special American machine with a dual ram and dual fixtures does this work.

Fixtures Pivot—Each fixture has three indexing stations. It pivots to rock down for the cutting strokes and upward to clear the broaches on their return strokes. Broaches cut only one side of the piece at a time and the axis of the piece is tilted slightly so that the tools will clear the opposite side.

There are three duplicate broaches on each ram of the machine, and each broach produces one notch in one of the three workpieces on its cutting stroke. While one set of broaches cuts, the other set makes an idle stroke. After each cut, all three workpieces index 60° for the next stroke.

When six notches are cut in any piece, it is unloaded by hand and another piece is loaded in its place. One piece is unloaded and another loaded at the end of each cycle.

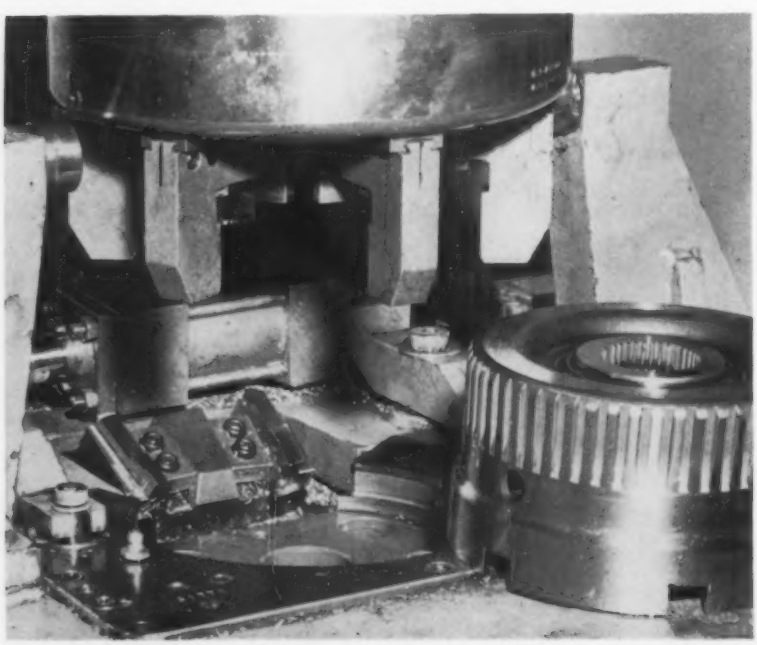
For easy removal of burrs, all broaching cuts are made toward the outside. Location of each piece is on the previously broached hub splines and against the outer face of the hub.

Final Broaching—Another special American machine does the finish broaching. It has a single self-clamping fixture at its center. Six horizontal broaches, arranged radially, make light cuts on three sides of all six slots but do not cut at the inner corners which are already radiused correctly.

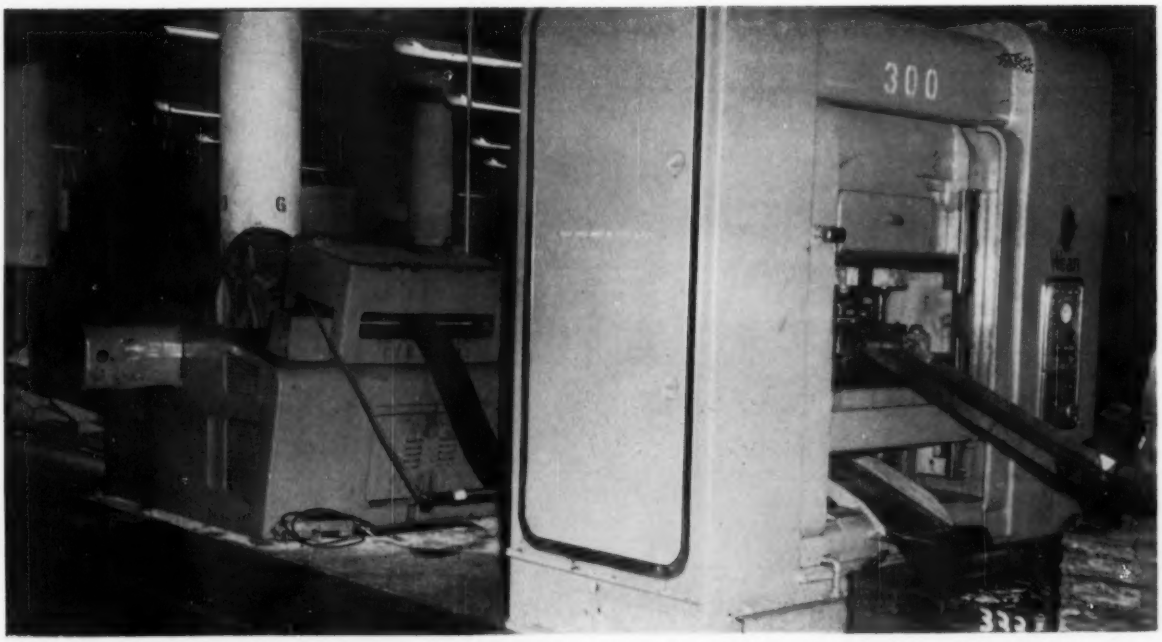
All of these broaches move outward at the same time and do not return to their inner position until after the broached piece is removed and before the next piece is loaded.

To remove burrs after the final broaching operation, each workpiece goes to a BMI Modern Burrmaster machine where right and left hand blade-type form cutters do the required job. These tools make a single cutting stroke in each slot, and the work is indexed six times in a complete cutting cycle.

For the final machining operation, parts go to one of three Heald Sizematic internal grinders.



LAST OPERATION: The assembly is indexed six times in this setup for blade-type cutters to remove all broaching burrs from slots.



FAST ACTION COUNTS: Dies converge in midair, blanking and piercing parts with forward feed motion.

Flying Press Speeds Short Runs

When the Wean flying press was introduced, it seemed a natural for volume production.

But you can make its speed pay off in other ways. One firm finds it ideal for blanking and piercing a wide variety of short-run parts.

▪ Can automatic equipment pay off on low-volume parts? Many production people are skeptical.

The answer depends on selecting a unit that can achieve high production on short runs and yet can adapt to fast changes. Engineers at Cadillac Motor Div., Detroit, faced this problem when the firm set up a separate press plant.

It's the blanking of smaller parts that's so often time and space consuming. The firm found the answer in the Wean flying press (The IRON AGE, July 18, 1957, p. 111). Capable of 300 strokes per minute, the unit has the versatility to keep up with demands.

Best performance is turned out at 175 strokes per minute. On some jobs the press works at slower speeds, as low as 50 strokes per minute, to hold tolerances on larger, more complicated shapes.

Qualify Parts—Before routing a part to the Wean press, plant tool engineers specify these requirements: the part must be reproducible from coil stock; the blank must be flat; and the operation must involve no more than piercing holes and cutoff.

In preliminary studies, planners found some 40 parts or operations falling into this classification. So far, the press has been used for about 20 varied shapes and sizes. No doubt more will be added as time goes on.

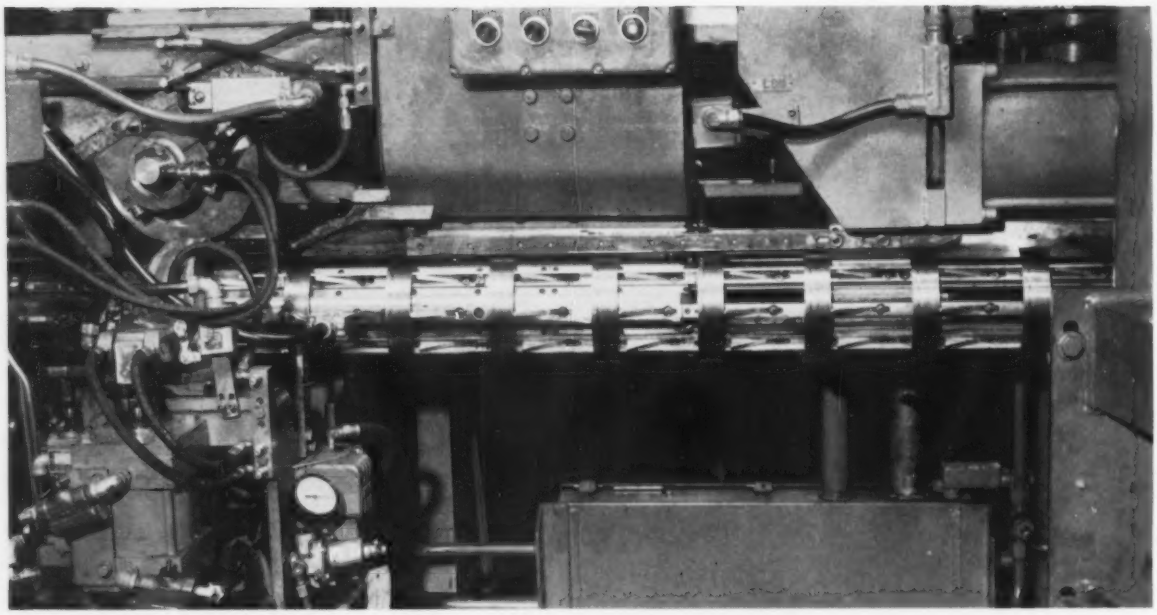
The press saves 150 pct in time per run. It's the fast stroke per minute rate that saves the time, since time for die changes is only slightly less than for conventional presses.

Runs usually take about 8 hours on the flying press for 18,000 to 20,000 pieces. Larger parts take somewhat longer—up to 12 hours.

Low Scrap Rate—The advantage in using coil stock is that there's no need for shear cutting before blanking. Scrap is reduced considerably for most parts.

So far, actual downtime of the press is virtually limited to changing coils of stock and the dies. It takes about four hours to switch coils of steel stock for different parts and get set for automatic feeding. Changing the die, done at the same time, takes about two hours.

An extra half hour is allowed to align and finish setting up. Cadillac reports that the quality of parts produced is about the same as expected from conventional presses. It's on the larger volume runs that the best time savings are realized.



AUTOMATIC LINE: Forming and welding setup at Redmond Co. quickly converts flat blanks into electric motor shells. Operator need only keep hopper (right rear) filled with blanks when warning light flashes.

Resistance Seam Welding Fits Into High-Speed Lines

By **C. E. Roth**—Design Engineer, The National Electric Welding Machines Co., Bay City, Mich.

Resistance seam welding is proving an ideal way to make rings and shells in volume.

Teamed with stamping and efficient handling in automated lines, it's cutting costs and improving quality in widely varying uses.

▪ One big plus for resistance welding is its compatibility with other processes. Many recent installations engineered by National take advantage of this trait. Often the result is lower cost; and many times, product quality is also upgraded.

Take, for example, production seam welding of rings and shells. This process has been very sucessful on sized rings.

Where production warrants, automated handling can take blanks from press to welder. Completed shells are strong in the weld area. In tests such parts usually fail in locations other than at the weld. So it's quite possible to route these parts from the welder through subsequent operations like trimming, notching, coining, piercing and forming.

Uses Coil Stock—An integrated process line of this type is in operation at Buick Div., GM, for production of a Dynaflow transmission stator ring. The part was originally designed as a light metal casting. Production engineering studies showed savings were possible by making it of coil stock, then seam welding to complete the ring. To give the part adequate stiffness engineers decided to add a bead, formed after welding.

The layout is U-shaped. First operation is mechanical feeding of coil strip from reel to straightener. This cuts strips to length and sends them to the roll station.

Form rolls convert the strip to circular shape. Next the parts transfer to the welding machine, where a loading mechanism pushes them on a long mandrel. Dogs transfer the pieces along the mandrel. In the last position the mandrel pushes the workpiece under the welding wheel to mash-weld the seam.

Weld Can Take It—After welding the part is transferred into another machine containing dies which flatten and shave off excess material; this leaves the weld area virtually flush.

Then the part is transferred onto a pickoff head, which swings 80° to place the part in another machine for forming the stiffener bead. After this expanding and swaging operation, finished pieces are ejected onto a conveyor and taken to a piercing press. In this final operation, holes are punched in the ring from the inside out. The die is a cam functioning type.

Since this is one of the delicate working parts of the Dynaflow transmission, tolerances are critical. Width and diameter of the ring are especially important. But the process easily holds them within the 0.005-in. range.

Other Types—Somewhat similar processing has been engineered for electric motor stator shells made at Redmond Co., Inc., Owosso, Mich. Again, this is proving more economical than previous methods. And the welding process holds critical tolerances within allowable limits without subsequent sizing or machining.

Tolerances maintained are plus 0.004 in. and minus 0.003 in. on diam, plus 0.008 in. total indicator reading (TIR) on the rims, and maximum out of parallel on ends of 0.004 in.

This installation handles stock in a practical range of 0.040 to 0.090 in. thick. It'll also process shells from 3½ to 7 in. In length it works from 1 to 10 in.

It's quite practical, too, for limited production and job-lot operations, to setup such equipment for hand feeding. Then the shells are preformed in a separate rolling operation. Seam welded parts are automatically ejected by the mandrel in the usual way.

High Production Rate — When additional sizing and other press operations are performed in machines linked by mechanical transfer, production is rated at about 600 pieces per hour. Heavier shells, welded automatically to close tolerances, are produced at about 450 to 500 pieces per hour.

In the electric motor shell machine, automatic feeding and transfer are largely responsible for this production rate. An adjustable hopper stacks the blanks for transfer to the roll forming station. The hopper may be loaded manually or by transfer from the blanking press. Blanks are then automatically positioned at the welder when a signal indicates the hopper at the machine is running out of blanks.

Another type of installation uses a bank of hoppers filled with blanks for different lengths of shells. The operator schedules production of various sizes merely by setting the machine to select and feed blanks from the proper hopper.

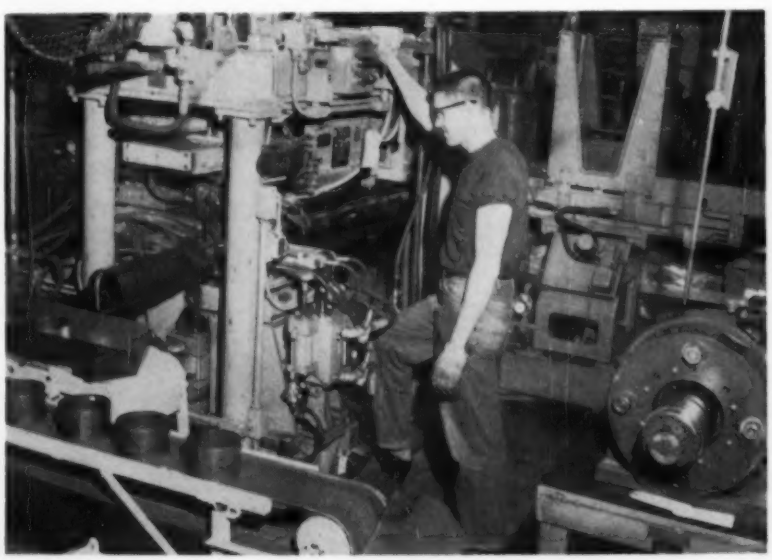
Actual feeding is done by a pneumatic cylinder. It slices a shell blank from the bottom of the hopper stack and pushes it into the forming rolls. With the bank of hoppers, however, feed is hydraulic.

Forming Is Critical—To handle the heavy blanks a special set of forming rolls has been developed. These form a highly accurate cylinder without the usual flat area at the leading edge of the blank. This is done by careful choice of roll size, roll speed and precise placement of shell forming shoe.

Since high shell clamping pressure is needed for welding, care must be taken to avoid distortion. As shells are formed they transfer pneumatically to an internally water cooled mandrel. At the forward end of the transfer stroke a mandrel backup and lock bar comes into position. This gives more support to the part, preventing deflection.

Four Steps—The actual clamping sequence is carefully controlled for dimensional stability. First, the contact shoe clamps shell end to mandrel. Second, the hinged links of the shell clamp wrap the shell around the mandrel under low pressure. Next, alignment fingers swing in, positioning shell edges for parallelism. And in the fourth step, high pressure is applied to the clamping shoe, then to the wraparound clamp and finally to the outer shell clamp.

Roller electrode pressure and traverse are pneumatic, but traverse speed is hydraulically controlled. Electrode and shaft are internally water cooled. To reduce maintenance and down time the electrode carriage is arranged for rapid changing of the roller electrode.



TRANSFER MANDREL: Machine at Buick continuously turns out Dynaflow stator rings. Retracting dogs on mandrel push formed rings along.

Submerged Arc Does Fast Job Of Rebuilding

Welding speed is only one factor in overall efficiency of a rebuilding operation.

Mounting and controls play a big part in attaining high production rates.

▪ In rebuilding parts designed to take heavy wear, improved welding techniques can lower costs drastically. Such is the case with rebuilding links on Caterpillar D-8 track.

Two Unionmelt DS welding heads, made by Linde Co., Div. of Union Carbide Corp., New York, cut track rebuilding time from 3 days to 3 hours at Missouri Valley Machinery Co., Omaha, Neb. The submerged-arc setup completes the job eight times faster than former manual metal-arc welding.

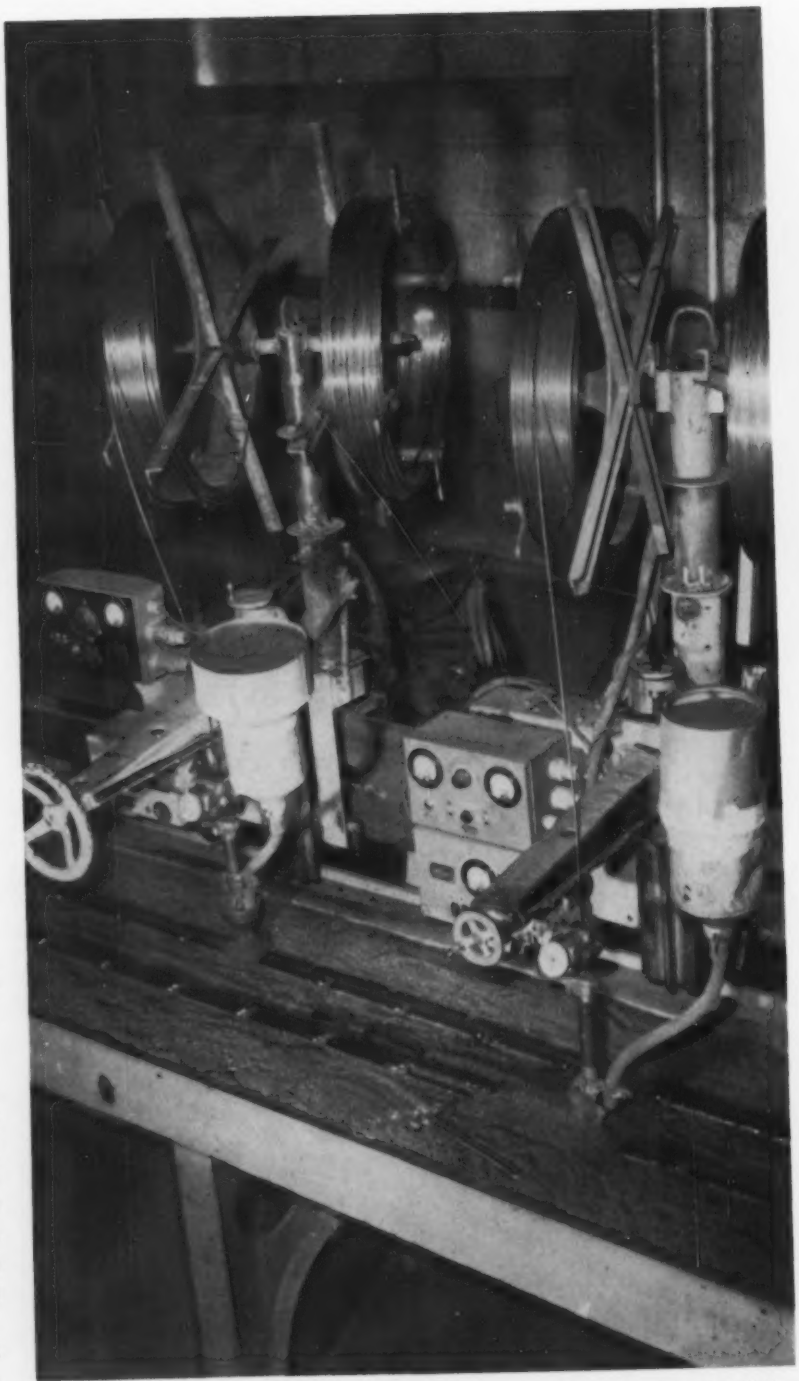
Dual Mounting — In a new mounting arrangement, the two heads operate independently. Separate Linde OM-48 side-beam carriages permit the links to be welded on both sides at the same time.

Cams located on the back of each beam trip a switch to control the welding over each link. Power settings are 30 v and 400 amps.

To produce a 3/16-in. deposit, it takes 10 passes over each side of the track in two layers of hard facing with 3/16-in. diam wire.

For Build-up—If the links have worn excessively, Oxweld No. 296 wire, 3/16-in. diam, is deposited before applying the two layers of hard facing. Unionmelt No. 80 welding composition adapts well to the build-up operations, since it does not add excess silicon and manganese to the weld metal.

With the two Unionmelt heads, it takes only 18 minutes to make a complete pass over the track, which measures 27 ft with 39 links.



FAST-WORKING TEAM: Two submerged-arc welding heads weld links on both sides at the same time.

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Fork lift trucks are featured in two new bulletins. One, four pages, covers rugged 3000-lb capacity gasoline powered models. The other deals with 3000-lb electrically run trucks. (Baker Industrial Trucks Div., The Otis Elevator Co.)

For free copy circle No. 16 on postcard, p. 141

Brazing Alloy

High-temperature brazing alloy is introduced in a data sheet. (Stainless Processing Div., Wall Colmonoy Corp.)

For free copy circle No. 17 on postcard, p. 141

Custom Metals

Made-to-order metals are available from a metals firm. An 8-page bulletin gives details. It describes

YARD and FACTORY
TRAILERS

Fifth wheel steer. Pneumatic tires. Steel deck. Oak end and side racks.

CUSTOM-BUILT and quality-built for long-time, low-cost service. Flat steel wheels, solid rubber or pneumatic tires. Fifth-wheel or four-wheel knuckle steer. Steel or wood deck, or special superstructure. Any desired capacity.

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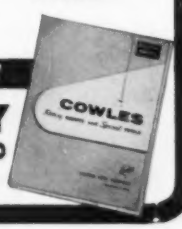
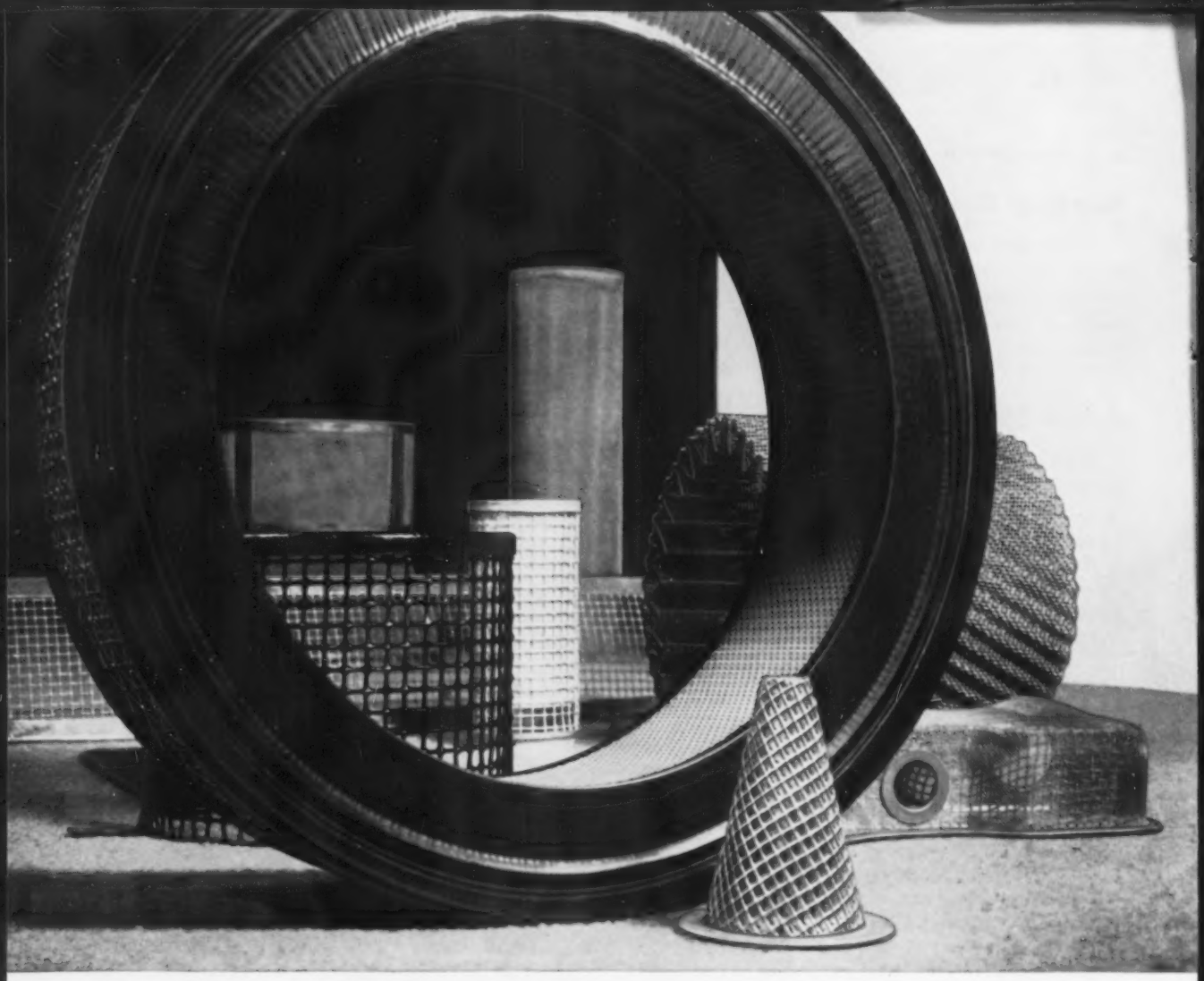
Specify Cowles—world's largest manufacturer of rotary knives—to get more tonnage per grind, and cut production costs. Our exceedingly high standards of precision manufacture and exacting heat treatment assure utmost accuracy, efficiency and long life. Complete line including slitting, trimming and specially engineered knives, in our **Max-cut; Specialloy; Superalloy; Circle C** and **Super C** grades—also carbide knives — for any requirement. Prompt delivery. Engineering help on any job. **Let Cowles quote on your requirements.**

Write for Bulletin No. 571 Today!



COWLES TOOL COMPANY
2060 WEST 110th STREET, CLEVELAND 2, OHIO
REPRESENTATIVES IN ALL PRINCIPAL CITIES



How to **USE** wire cloth at lower cost

Today many companies are able to make wire cloth components, like these shown here, at lower cost than ever. The answer lies in new services, new developments worked out by the *Reynolds Wire Division* of National-Standard . . . ideas aimed at the more effective, less wasteful *use* of industrial wire cloth. For example . . .

5 SUGGESTIONS:

1. Check on wire cloth rolls 2 to 8 times normal length . . . for 2 to 8 times as much production in a single run. Fewer shutdowns. Less handling.

2. Consider pre-slit widths, plain or with woven-in reinforcement, as narrow as 1 inch or less, to meet your requirements exactly with minimum handling and waste.

3. Evaluate Reynolds' new palletized packaging. Less chance of damage. Faster, easier handling on arrival, in and out of storage and right to production operations.

4. Look into the many different weaves, meshes, metals, finishes and coatings . . . some unique with Reynolds . . . to make sure of the optimum specification for your requirement.

5. By all means take advantage of Reynolds' engineering and analytical service . . . nation-wide and unmatched in the industry. Time and time again it contributes to a better finished product at lower cost.

NATIONAL NS NATIONAL-STANDARD Company **STANDARD**

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; *fine wire, stainless, music spring and plated wires* • WORCESTER WIRE WORKS, Worcester, Mass.; *music spring, stainless and plated wires, high and low carbon specialties* WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • ATHENIA STEEL, Clifton, N. J.; *flat, high carbon spring steels* • REYNOLDS WIRE, Dixon, Ill.; *industrial wire cloth*

facilities for melting, forging, hot and cold rolling, and heat treating. (Precision Metals Div., Hamilton Watch Co.)
For free copy circle No. 18 on postcard, p. 141

Stud Welding

Stud welding of sheet metal, including galvanized steel 0.020-in. thick, is announced in a technical bulletin. No backing is needed on the sheet and no damage reported. (Shielded Stud Welding Co.)
For free copy circle No. 19 on postcard, p. 141

Big Steel Pipe

Step-by-step production of 20- to 36-in. diam steel pipe in a new plant is detailed in a 28-page illustrated booklet. (Welland Tubes Ltd.)
For free copy circle No. 20 on postcard, p. 141

Insulation

Insulation for indoor or outdoor applications described in an 8-page catalog is 85 pct magnesia. Calcium silicate insulation is also covered. (Ehret Magnesia Mfg. Co.)
For free copy circle No. 21 on postcard, p. 141

Thermocouple Wire

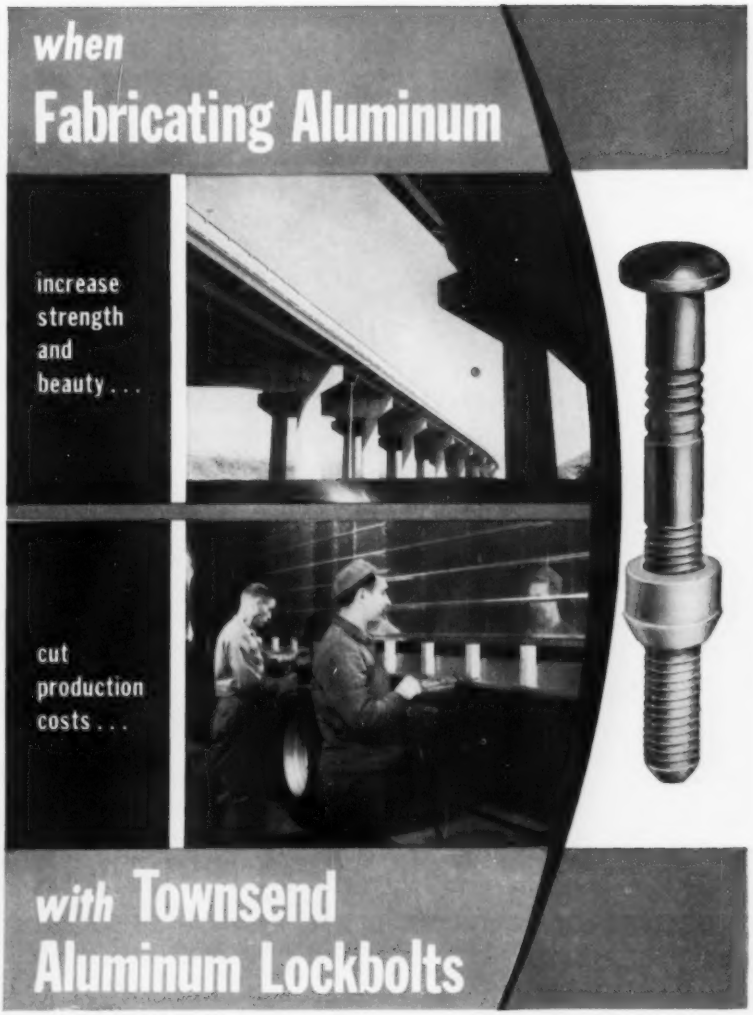
Recently revised, a catalog deals with thermocouple extension wires. (Thermo Electric Co., Inc.)
For free copy circle No. 22 on postcard, p. 141

Jig-Driller-Fixture

Two ingenious vises introduced in a 14-page guide help ordinary drill presses or bandsaws step-up production. These tools act as jig, angle driller, small fixture holder, sheet metal driller; allow tool changing in seconds without stopping spindles. (AMF Tool Div.)
For free copy circle No. 23 on postcard, p. 141

Chemical Milling

Chemical milling and finishing is discussed in a 30-page brochure. (Anadite Inc.)
For free copy circle No. 24 on postcard, p. 141



Appearance is improved, since the aluminum lockbolts* match the material being fastened. Joints are neat—there is no roughness or weld-splatter, no tool marks, no rust streaks after exposure to weather.

Lockbolts will not alter the mechanical values of the material being fastened, and their high tensile pre-load values are uniform. These two factors make design calculations simpler and more accurate.

Townsend aluminum lockbolts can lower your production costs, because operators with no special skill or training can make strong, uniform joints at high production rates. The setting guns are designed to eliminate the possibility of human error.

If you are fastening aluminum, investigate the advantages of Townsend lockbolts. Write for Bulletin TL-101. Townsend Company, P. O. Box 237-B, New Brighton, Pa.

*Licensed under Huck patents RE22,792; 2,114,493; 2,527,307; 2,531,048; 2,531,049 and 2,754,703

The Fastening Authority

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...New Booklet On Waterbury Farrel Straighteners

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Twelve-page booklet covers Roll Feed Straighteners, Roll Straighteners, Back Tension Units and Special Straighteners for ferrous and non-ferrous sheet and strip. Includes stock, standard and special straightener units for practically the entire range of industrial application. Explains how use of a Waterbury Farrel straightener can increase production via consistent, high-precision straightening. Send for this free booklet today. Either the coupon or a brief note on your letterhead will bring it to you promptly.

The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Please send Straightener Circular #820-T-5 to:

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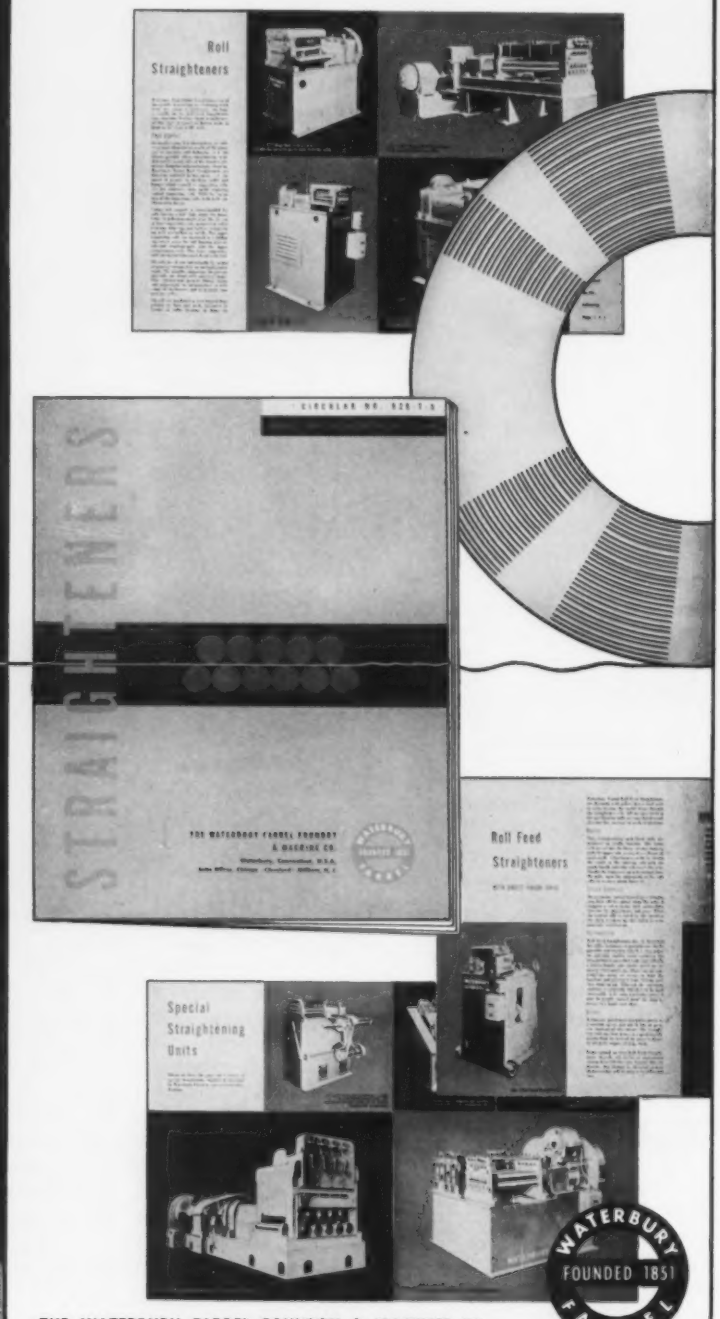

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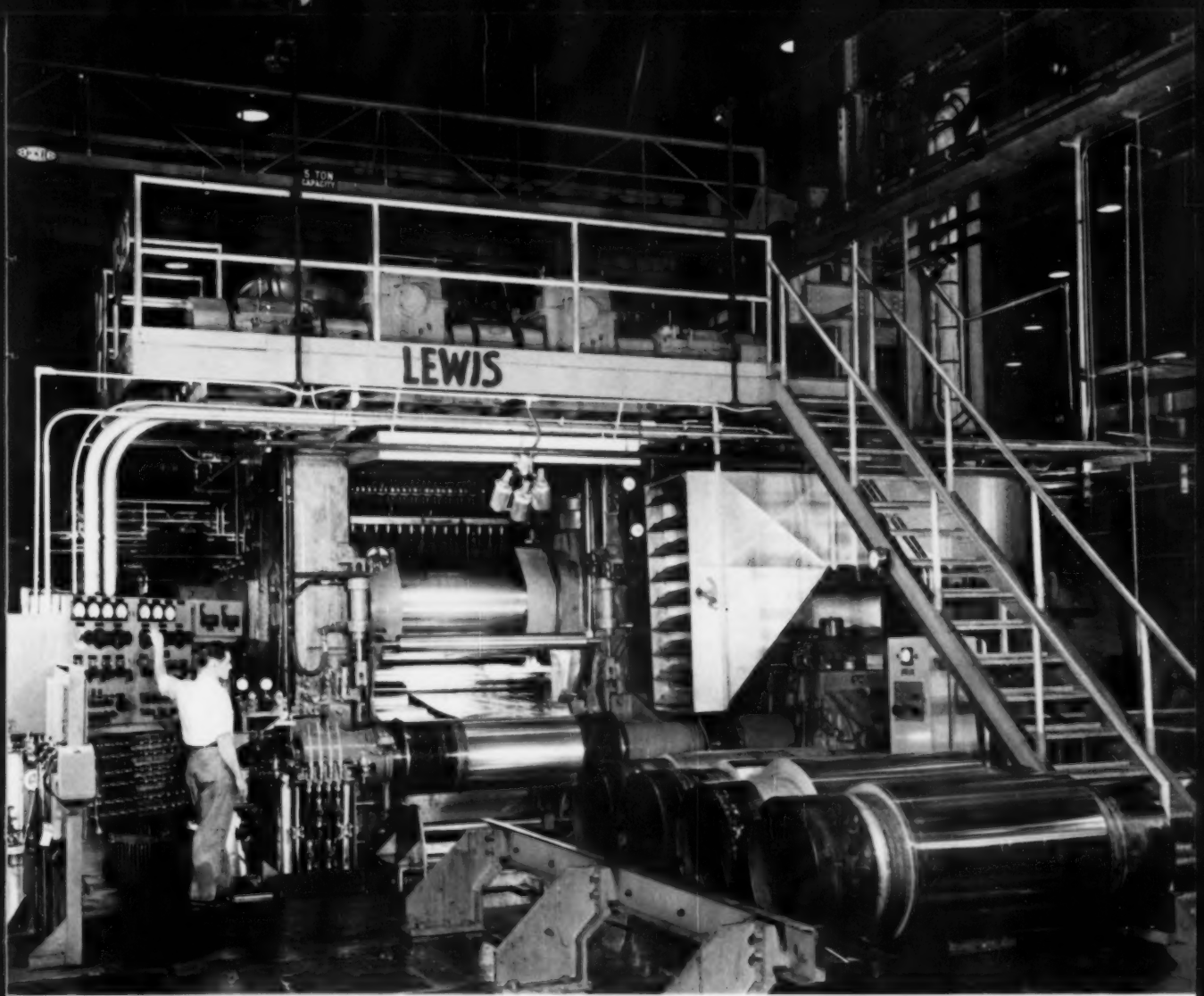

9½ and 34-inch by 60-inch Foil Mill at Kaiser Aluminum and Chemical Corporation, Ravenswood, W.Va.

BLAW-KNOX
ALUMINUM FOIL MILLS

Blaw-Knox designs and builds a full range of Aluminum foil mills complete with auxiliary equipment to meet individual requirements. Other Blaw-Knox equipment for metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

12-ton cast Nickel steel die produced by the Detroit Gray Iron Foundry Company, Detroit, Michigan. Die has sections up to 2 feet thick.

Forms floor pans of "production-line" Fords...

Big runs don't faze deep-hardened cast Nickel steel die

This cast Nickel steel die cold-forms heavy-gauge carbon steel sheets into floor pans for production-line Fords.

This is grueling service: production runs of well over a million pieces . . . severe abrasion . . . terrific impact.

For this reason, Ford uses a deep-hardening nickel alloy steel. Nominal composition is 0.50 per cent Carbon . . . 0.60 - 0.75 per cent Chromium . . . 1.50 - 1.75 per cent Nickel.

Nickel steels are just right for many applications

For parts with massive sections, or variable sections, nickel alloyed steels offer high strength, hardness, toughness and wear resistance. Alloying with Nickel also permits satisfactory heat treatment to develop the full properties of the materials.

A Nickel alloy steel—cast or wrought – may be the answer for your special service or fabrication need. If you'd like an Inco specialist to work along with you in selecting the right grade, just write. Include details.

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street INCO New York 5, N. Y.

INCO NICKEL
NICKEL ALLOYS PERFORM BETTER LONGER

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Weldments

Quick service in fabricating weldments and machine bases to your specifications is promised by a big job shop in a 4-page bulletin. This firm handles quantities of one, one hundred, one thousand, as many as you need. (Littleford Bros., Inc.)

For free copy circle No. 25 on postcard

Marking Crayons

Special crayons for marking industrial items, from glass and china to iron and steel, are listed on a reference chart. Crayons resist extreme heat, cold, dampness, rough or slick surfaces. (Joseph Dixon Crucible Co.)

For free copy circle No. 26 on postcard

Creep Rupture Tester

A 4-page bulletin announces a new creep rupture tester. It's specifically for testing smaller size specimens under lighter loads. (Arcweld Mfg. Co.)

For free copy circle No. 27 on postcard

Presses

Eccentric gear presses are detailed in an 8-page bulletin. These straight-side units handle deep drawing, other jobs in which heavy tonnage is encountered well up on the stroke. (Hamilton Div., Baldwin-Lima-Hamilton Corp.)

For free copy circle No. 28 on postcard

Welded Tube, Pipe

Condensed data on working seamless or welded tubing and pipe is included in a chart. It summarizes hot working, annealing, welding and forming information on 24 widely-used austenitic and hardenable and non-hardenable ferritic stainless tubing steels. (Tubular Products Div., Babcock & Wilcox Co.)

For free copy circle No. 29 on postcard

Parts Feeders

A folder details a parts feeder that feeds, orients and counts up to 200,000 items per hour. (U. S. Engineering Co.)

For free copy circle No. 30 on postcard

Dust Controllers

Free-discharge valves covered in a data sheet serve dust collection units. They handle dry flowable materials, particularly abrasives. (The Ducon Co.)

For free copy circle No. 31 on postcard

Lift Truck Guide

Information on lift truck construction, operation and maintenance, plus helpful data on handling and stacking are contained in a lift truck operators' guide. (Towmotor Corp.)

For free copy circle No. 32 on postcard

Soft Solder

Ultra high purity soft solder preforms for automatic soldering of electronic and other equipment is described in new literature. (Alpha Metals, Inc.)

For free copy circle No. 33 on postcard

Diecast Fastener

An 8-page catalog describes a line of unique diecast threaded fasteners. They are of diecast zinc and molded nylon. (Gries Reproducer Corp.)

For free copy circle No. 34 on postcard

Pitch Diameter

Two helpful technical bulletins deal with measuring pitch diameter of a screw thread: (1) "Does the Three-Wire System Measure True Pitch Diameter?" and (2) "The Effectiveness of Various Contacting Elements Used for Gaging and

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FREE LITERATURE

Measuring Pitch Diameter." (The Johnson Gage Co.)

For free copy circle No. 35 on postcard

Throw-away Tools

Listed in a catalog are 42 styles of throw-away carbide insert tools. It also lists 220 different holders. (Kennametal, Inc.)

For free copy circle No. 36 on postcard

Aluminum Conductor

Anodized aluminum strip conductors of electricity are analyzed in a dozen-page booklet. (Reynolds Metals Co.)

For free copy circle No. 37 on postcard

Welded-pipe Mill

Want to visit an all-electronically controlled pipe mill? A 4-page bulletin takes you on a capsule tour of Alberta-Phoenix Tube & Pipe, Ltd. and its new automated mill. (Reliance Electric & Engineering Co.)

For free copy circle No. 38 on postcard

Heavy Metal

A bulletin describes a tungsten-nickel-copper alloy. (Firth Sterling, Inc.)

For free copy circle No. 39 on postcard

Flowmeters

Things to look for when choosing flowmeters appear in a technical bulletin. Advantages and limitations of basic types are discussed. (Fischer & Porter Co.)

For free copy circle No. 40 on postcard

Truck Batteries

Batteries that help electric fork trucks lift more longer are reviewed in a 4-page bulletin. (C & D Batteries, Inc.)

For free copy circle No. 41 on postcard

Separating Screens

Woven manganese steel screens presented in a 16-page folder withstand punishment by crushed stone, ores, slags, etc. They assure high-efficiency screening at low cost per ton. (Manganese Steel Forge Co.)

For free copy circle No. 42 on postcard

Woven Screens

Specially alloyed woven wire screens for vibrator uses are described in a 16-page brochure. Hard-drawn or hardened and tempered, these screens are crimped, woven, and "tailored" to fit particular applications. (Audubon Wire Cloth Corp.)

For free copy circle No. 43 on postcard

Working Cobalt Alloys

Machining of 22 superalloys and 3 metal-glass sealing alloys is discussed in a special report. Drilling, turning, facing, milling, broaching, reaming, shaping, tapping, cutoff, and unusual machining methods are reviewed. (For free copy write on company letterhead to Cobalt Information Center, c/o Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio.)

Countersinks

Solid carbide single-flute countersinks and double-end countersinks and center drills are announced in a publication. These tools have an eccentric relief on the cutting edge; this means only the face of the flute needs resharpening. (Wendt-Sonis Co.)

For free copy circle No. 44 on postcard

Light Hand-Trucks

Magnesium push-around all purpose hand trucks pictured in a 4-page folder come in 8 basic models with 26 pieces of equipment optional. (Brooks & Perkins, Inc.)

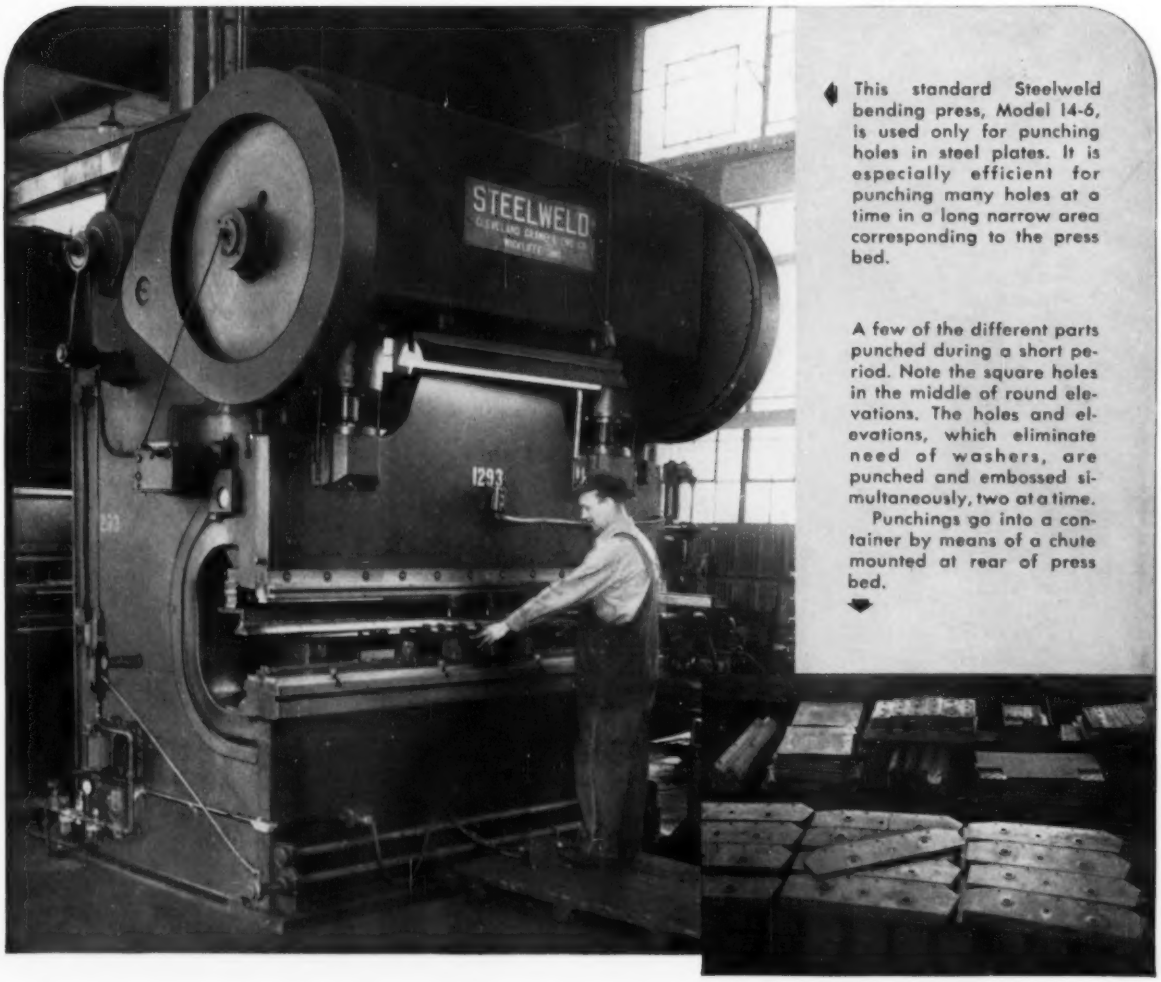
For free copy circle No. 45 on postcard

Ladders, Platforms

Equipment for above-floor working (ceilings, walls, high objects, etc.) appears in a 20-page bulletin. Covered are: steel ladders, aluminum ladders, work platforms, mobile access lifts. (Ballymore Co.)

For free copy circle No. 46 on postcard

Press Brake Used Solely For Multiple Punching



This standard Steelweld bending press, Model 14-6, is used only for punching holes in steel plates. It is especially efficient for punching many holes at a time in a long narrow area corresponding to the press bed.

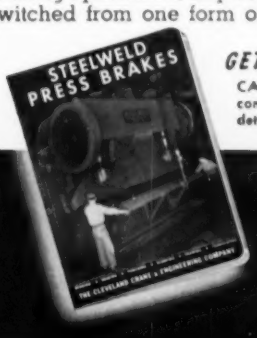
A few of the different parts punched during a short period. Note the square holes in the middle of round elevations. The holes and elevations, which eliminate need of washers, are punched and embossed simultaneously, two at a time.

Punchings go into a container by means of a chute mounted at rear of press bed.

BENDING BRAKES are not always used for bending. Here is one that is used solely for multiple-punching work. It is on its 12th year of continuous operation, punching holes of various sizes and numbers.

While other Steelweld presses in the plant where this machine is located handle many bending and forming operations, any Steelweld can be quickly switched from one form of work to another and thus take care of a wide variety of jobs: bending, forming, multiple-punching, blanking, etc.

Steelweld Bending Presses are versatile, heavily-built tools designed for quick set-up, easy operation and long trouble-free performance. Hundreds of these machines are serving every segment of the metal-working industry. If you need a press brake, you will be happy with a tried and proven Steelweld.



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CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

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STEELWELD

PRESS BRAKES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

J&L STEEL

JALZINC ZINC COATED SHEET

This J&L cold rolled steel has been annealed and the surface prepared for coating on this modern Sendzimir mill. Here it is emerging from a flux-free molten zinc bath, where wetting and bonding occur instantaneously. Zinc is bonded to the base metal in a tight, high lustre coating that will not flake or chip.

"JalZinc gives us maximum corrosion resistance. And there's no flaking in our tough crimping operation."

. . . reports builder of unique steel structures

"JalZinc sheets meet our requirement for strong, corrosion-resistant zinc coated sheet that will hold its finish through tough transverse crimping operations," states Mr. Peter S. Pedersen, Jr., president of Wonder Building Corporation of America, Chicago.

JalZinc is produced by J&L, a major integrated steel producer, under the most rigid quality control. J&L's modern continuous galvanizing process coats the steel with a bright, uniform spangle that improves end product appearance.

Sheet metal users across the country are finding that JalZinc is a superior quality steel that can be bent, stamped, rolled, crimped beyond belief without damage to the coating.

Ask your distributor about JalZinc for your next job, or write Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Penna.

These pre-engineered trussless steel structures are fabricated at the Wonder Building plant, Chicago, from 18 gauge JalZinc sheets.

Superior quality JalZinc is readily available in a wide range of gauges and widths in both cut lengths and coils.

JL STEEL

Jones & Laughlin Steel Corporation

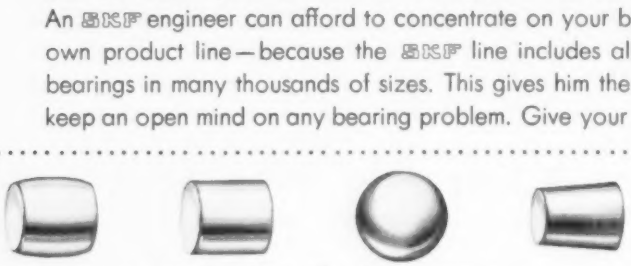
PITTSBURGH, PENNSYLVANIA

creative designing calls for an open mind

Leonardo Da Vinci's design for an odometer *Model courtesy of IBM*

EVEN DA VINCI'S ODOMETER COULD HAVE BEEN BETTER WITH HELP FROM AN SKF ENGINEER.

An SKF engineer can afford to concentrate on your bearing problem rather than his own product line—because the SKF line includes all four types of ball and roller bearings in many thousands of sizes. This gives him the kind of flexibility he needs to keep an open mind on any bearing problem. Give your problem to SKF and see. 7836



Spherical, Cylindrical, Ball, and "Tyson" *Tapered Roller Bearings*

EVERY TYPE—EVERY USE

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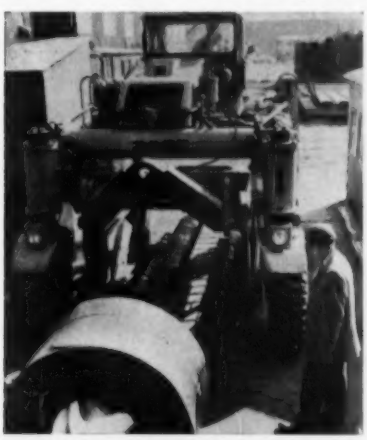
Efficient Handlers Speed Strip From Hot Mill to Finish Mills

Moving a hot strip mill next door to its pipe mills didn't solve all handling problems for a major steel producer.

It still had to transport coiled strip to the pipe mills with the least possible effort and expense. And it did.

▪ Thanks to an efficient materials handling system, a large steel mill is improving its filling of customer orders. Although installed and maintained on a relatively low capital investment, the system enables better internal scheduling and improved production flexibility.

In service at Jones & Laughlin, Aliquippa, Pa., the setup moves products at a new 44-in. hot strip mill. It transports these to adjacent



Over-the-load carrier picks up a coil of strip steel.

electric and continuous weld pipe mills. Previously, coiled skelp and strip for these finishing mills had been produced at the firm's Cleveland works, sent via rail to Aliquippa. The new handling arrangement speeds these materials to the finishing mills in minutes.

Uses Special Carriers — Developed by J&L engineers, the system involves: (1) a specially-designed outlet conveyor at the strip mill; (2) use of Clark-Ross "over-the-load" carriers for pickup, transport and laydown of coils; (3) coil storage areas or depots adjacent to the finishing mills; (4) a simplified system of accounting. The latter permits ready identification of coils for scheduling and inventory purposes.

In addition, a new plant roadway was built from the strip mill to the

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 141. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

DYSON
LARGE
EYE
BARS
...1¾" thru 8"
BOLT DIAMETER
• Made singly or coupled to specifications
• Regular, high tensile and stainless steels
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• Complete non-destructive inspection, Magnaflux, X-ray, Radiography, tensile and chemical analysis
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Write for our 72-page weight book containing 61 tables of weights of round, square, hexagon, octagon and flat steel bars.
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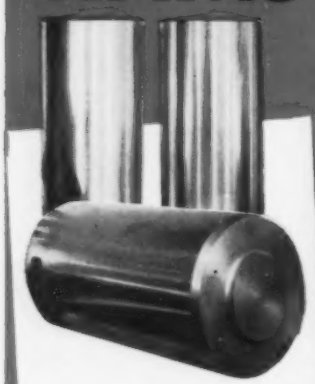

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Hyde Park Rams are available in Chilled or Alloy Iron.

Furnished in hardness range to meet your specification . . . ground to your required size.

On your next replacement of Rams—or for new equipment—consult us. Our engineers will be glad to assist you.

Red Circle Rolls for every Purpose

Rolling Mill Equipment

Gray Iron Castings up to 80,000 lb.

Hyde Park

FOUNDRY & MACHINE CO.

Hyde Park, Westmoreland Co., Pa.

ROLLS

ROLLING MILL MACHINERY

GRAY IRON CASTINGS

TECHNICAL BRIEFS

finishing mills. This roadway establishes an almost straight line carry from the strip mill to the electric weld and continuous weld pipe mills.

No Crane; No Rails—Individual skelp or strip coils, weighing about 7½ tons, enter the special conveyor at ground level. They assemble in groups of three or more to a maximum weight of about 25 tons.

The Ross carriers then pick up and transport the coils to a predesignated storage area. Or they go directly into the finishing mills in the case of immediate use. Neither overhead crane service nor rail service is necessary.

Coils Zip Along — Round trip per carrier from strip mill pick-up point, with a load of 20 or 25 net tons, takes 20 minutes or less. Longest haul in the operation is about 1¾ mi, equivalent to about 3½ mi round trip.

Four carriers are in use at one time to service the strip and finishing mills. However, to provide for breakdowns, five are being leased from Material Handling, Inc., Pittsburgh, Pa. Their manufacturer is Ross Carrier Div., Clark Equipment Co.

Uses Unique Ram—Each carrier has a specially-designed 12-ft ram about 1 ft in diam mounted in a steel framework. This attaches to the regular "shoes" of the hoisting mechanism. The entire device hangs under the framework between the wheels.

Power

Maintenance-free pump uses water as hydraulic medium

Providing hydro-static pressure to work a 40-000-lb capacity hydraulic elevator, a pump installed a year ago is still working fine. Maintenance has been unnecessary.

Serving the Black, Sivalls & Bryson Steel Plant, Oklahoma City, the rugged unit pumps fresh water which provides pressure for a 17.5-in. diam x 22-in. ram. This actuates the 20-ton capacity elevator. It lifts tanks and pressure vessels for welding.

A product of John Bean Div., Food Machinery & Chemical Corp.,

Worker pushes start button and activates the 50-gpm pump.

San Jose, Calif., the pump uses water as a medium because: (1) it's practically odorless; (2) there's no

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fire hazard; (3) cost is lower; and (4) the pump's unique construction permits its effective use as a hydraulic medium.

Packaging

Toolsteel packed like "cold cuts" resists rust, dirt

Taking a cue from luncheon meat packers, a major producer of toolsteels is now packaging heavy metal bars in a tough plastic "skin." Made of transparent polyethylene, the package not only protects the oil-hardening ground flat stock during shipment and storage, but also while it's cut into smaller sections by its user.

A product of Crucible Steel Co. of America, Pittsburgh, the toolsteel is finished to close dimensional tolerances, free from decarburization. It's ready to use as received for making tools, dies, punches, gages, etc.

Does Not Tear—The plastic envelope protects the precision-ground stock's surface from rust, scratches

Its plastic wrapper protects this metal from vise jaws.

and grime. Sharp edges on the stock itself are unlikely to cut it. Easily holding heavy steel sections, the container resists ripping in transit.

From the user's standpoint, the plastic "skin" offers three distinct advantages. He can peel back just enough of the pliable wrapper to cut off the required length for a particular job. This protects the

THE ELECTRIC FURNACE CO. Salem, Ohio
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Bell Type FURNACES

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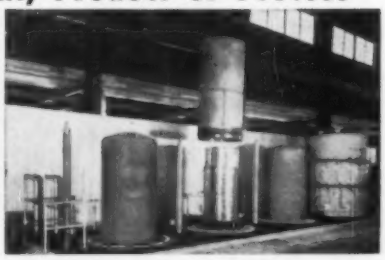
Part of an installation of large gas fired three-stack rectangular bell type forced circulation special atmosphere furnaces for annealing strip.



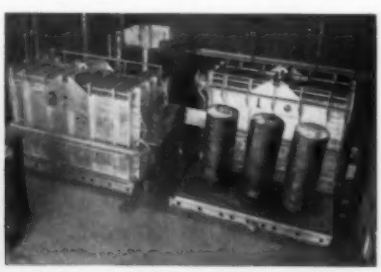
Built right—over 20 years ago—this EF installation is still in operation, daily—and producing first class work.

Single or multi-stack—circular, rectangular or square types—upright, elevator or partial pits—gas fired, oil fired or electric—correctly designed, built and installed, ready to produce.

Backed by over 40 years of practical furnace building experience, EF furnaces incorporate all the advantages of all bell type designs, for processing strip, wire, rod and other ferrous and non-ferrous products.

EF bell type furnaces installed over 20 years ago are still in service daily, producing first class work. There's no substitute for experience.

Part of another installation of large EF gas fired three-stack rectangular bell type forced circulation special atmosphere furnaces for annealing steel strip.



EF gas fired special atmosphere rectangular bell type strip annealers with individually controlled forced circulation three-stack bases each with capacity of 135,000 lbs. per charge.

Submit your production furnace problems to experienced EF engineers—it pays.

EF

BULLETIN No. 461
shows typical installations of EF Gas-fired, Oil-fired and Electric Furnaces.
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25-20 Casting with Welded Assembly

This is a separator destined for a reaction process. It is typical of the kind of work we do in the high alloy casting field. In the 25 Cr-20 Ni range it is alloyed to withstand both corrosion and heat. Assembled, its weight runs some 2000 pounds. It was inspected and tested under very rigid ASME Code requirements.

The production of chrome iron and chrome nickel castings has been our sole business since 1922. We added centrifugal castings to our service in 1933 and shell molded castings in 1955. Our metallurgists have extensive knowledge of the many operations requiring high temperature and corrosion resistant castings. Perhaps this experience would be helpful to you if you are confronted with a specific problem and wish to determine the best alloying combination for your required castings. We can be helpful, too, in designing the unit, contributing our knowledge of strength and stresses in castings.

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DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

balance of the piece against grit or vise jaws while sawing. It then may be rolled back to protect the remainder of the stock during storage.

Transparency of the wrapper also permits the user to determine inventory and length of his stock without unwrapping.

The "skinned" stock comes in ground flat material, hot-rolled bars, and drill rod.

Fabricating

Production welding speeds railroad car building

Fabrication of railroad cars can be speeded considerably by concentrating the "firepower" of welders the same way military men use small arms weapons. This is the feeling of a rail car builder that stategically deploys 13 welding operators on a hopper car job.

The fabricator, Greenville Steel Car Co., Greenville, Pa., skillfully places the battery of men side-by-side, timing each and the whole

Side-by-side, 13 welders work on this hopper car job.

operation. Each welder has certain assigned joints; each has an equal amount of work. There is no overlapping or shoulder-banging; no interference between them.

Uses Powder Electrode—Using an iron powder E-6013 electrode supplied by The Lincoln Electric

Co., Cleveland, the welders quickly weld downhill joints with ease.

The car shop uses alternating-current welding machines because these reduce arc blow and permit use of high currents and fast welding speeds.

After welding one side, a handling unit rotates the car 180°. The welders then repeat the work.

Welding

Improvised automatic welder tackles large, tough job

What do you do when you're faced with a welding job where: the work is unusually long; it calls for 2-in., low-carbon steel plates to be joined back to back; hand welding takes about 40 minutes per pass, and costs may evaporate your profit?

How do you overcome distortion, which comes from pouring so much heat into the 31-ft, ⅜-in. grooves provided for the fillet welds?

These, roughly, were problems facing engineers at Baker Perkins Inc., Saginaw, Mich., recently. The processing equipment firm had to produce from structural steel, four sides of a battery of huge press frames. Each frame weighs around 27 tons.

Unique Automation—What the engineers came up with to speed the job isn't exactly standard procedure. But it's effective. The setup not only automates the operation by leashing an automatic submerged arc welding head to a task normally tackled manually; it also reduces welding and handling time by 50 pct.

The setup includes an in-plant made cradle type positioner, a submerged arc welding head mounted on a rail, and some well-placed shims to prestress the long steel structural members.

Two Cradles Support It—Positioning units consist of two cradles to support each end of the structural steel. Each cradle end consists of two halves. When fitted together to form a complete "wheel," it measures 70 in. diam.

Cambridge WOVEN WIRE BELTS

TYPICAL INSTALLATION FOR AUTOMATED CLEANING

Open mesh assures product uniformity in continuous processing

Cambridge Woven Wire Belts provide thorough, uniform degreasing or washing because cleaning solutions and vapors circulate freely *through* the open mesh of the belt to reach all parts of the product. In one continuous operation, parts can be carried through a degreasing, rinse, degreasing cycle to maintain capacity production. In heat treating, brazing, annealing and quenching operations too, Cambridge belts cut operating costs and increase production. Here's why:

CONTINUOUSLY MOVING BELT ELIMINATES BATCH PROCESSING for faster, more economical production.

ALL-METAL CONSTRUCTION RESISTS CORROSION, HEAT; takes temperatures up to 2100° F.; has no seams, lacers or fasteners to weaken or break.

OPEN MESH ALLOWS RAPID DRAINAGE of process solutions; assures thorough immersion of product.

SPECIAL CROSS FLIGHTS OR RAISED EDGES are available to hold product on belt during inclined movement.

Talk to your Cambridge FIELD ENGINEER soon — he'll explain the many advantages of continuous heat treating on Cambridge belts. And, he'll recommend the belt size, mesh or weave — in the metal or alloy — best suited to your operations. You'll find his name in the classified phone book under "BELTING, MECHANICAL". Or, write for FREE 130-PAGE REFERENCE MANUAL giving mesh specifications, design information and metallurgical data.

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TECHNICAL BRIEFS

Cut-outs in each cradle half are large enough to handle the largest beam to be welded. Cradles themselves in turn are arranged to roll on rubber covered rolls; one set is power driven at variable speeds.

Uses Spare Part—The weld setup was made from a spare head, mounted on special wheels to roll on a beam type track. The welding head is arranged so it travels on the track in one direction, pulling a flux recovery unit behind it like

Submerged arc welding head lays a 3/8-in. fillet weld.

a caboose. Power for welding is supplied by two 500-amp ac welders.

The work involves mainly welding of four 12-in., 31-ft ship plates, and four 12-in., 31-ft I-beams to two back-to-back 2-in. plates 53-in. wide. Two ship plates are placed on the outside and two I-beams are positioned on the inside on each 2-in. plate prior to welding. The 2-in. plates with their assemblies tacked on are then placed back-to-back.

Lubricants

A new grease combines assets of many different greases. In one large steel mill, the user replaces four greases. Result: less handling, storage and inventory. Using one grease also reduces chances of using the wrong one.

The multi-service grease has long

service life, resists water, maintains chemical stability in —15 to +300°F range, fights rust and corrosion, and is compatible with other greases. Socony Mobil Oil Co., Inc., New York, makes it.

Diecasting

Tiny zinc alloy tinsnips cut brass, paper, wire

Are your maintenance crew and production staff interested in using some tiny 1-in. tinsnips? Chances are they aren't. But the snips actually work. Though primarily serving as novelties, these miniature tools are proof of a diecasting process which turns out movable parts in "one shot" by special automated machines.

Known as the Intercast process, the method produces articulated parts in one operation. Pliers, shears, jackknives, nutcrackers and tinsnips have all been made by this technique. Pieces come out of the machine ready for shipment.

Casts Chain Links—Even a continuous chain with individual, unjoined links is produced by this method. So are items like binder rings, self-aligning bearings, and pulley and swivel combinations. Such pieces have a ½-oz upper weight limit; size limit is 1.5 in.

Tiny diecast tinsnips like these actually cut wire.

There is no lower limit. In theory, any part that can be designed can be cast.

Though well-known throughout the industry, the Intercast process

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. . . in salvaging and marketing your sheet metal scrap!

If your metal stamping or metal forming operations are generating sheet metal scrap in substantial volume — you have a disposal problem to solve.

In many plants the baling of sheet metal scrap has proved a highly profitable operation in the disposal process — resulting in such benefits as lower scrap handling costs, better use of floor space, increased production, higher average scrap prices.

Galland-Henning Hydraulic Baling Presses have been serving industry for many years in the low-cost salvaging of sheet metal scrap. If you are planning a new plant, the modernization or expansion of present facilities — the orderly baling of your sheet metal scrap is worth considering from the overall profit angle. Galland-Henning offers you competent counsel on this subject, without cost or obligation.

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SCRAP METAL BALING PRESSES

is basically a secret. Some information has been divulged however about the production of such products as the binder ring. This is cast complete with hinge, ready to work: As the first half of the ring is cast, the zinc alloy hardens very quickly. Its ends become part of the die for the second half.

Metal for the second half enters a fraction of a second later. It flows around the tongue and through the pivot hole of the hardened first half, forming an integral assembly.

Inspection

No-overlap joints on tanks permit 100 pct X-raying

High pressure storage tanks with new flued manways eliminate overlapping double joints. As a result they permit 100 pct X-ray inspection of all welds.

Now being marketed with all manway welds X-rayed by Advanced Products Div., ACF Industries, Inc., Milton, Pa., the tanks are fabricated in capacities to 30,000 gal. Their "uni-formed" construction, in addition to increasing protection that results from X-ray inspection, also completely eliminates unplugged "tell-tale" holes required in manway collars of conventional tanks. These holes can result in corrosion between the collar and tank.

Rail Cars Have Them—The new storage-tank series evolved from the company's successful experience with flued manways on tanks of railroad tank cars. Flued manways have been rolling the tracks for several years but have never before been incorporated into large storage tanks.

Conventional storage-tank manways are made by cutting a hole in the tank, fillet-welding a steel cylinder inside the hole and strengthening the joint with an exterior collar.

X-rays All Welds—The base of a "uni-formed" manway is drawn or "flued" from plate that becomes a

section of the tank itself. This results in a smooth, curved, unbroken configuration where the manway enters the tank. The manway section is butt-welded to the rest of the tank and to a short manway cylinder and all welds are X-rayed.

The manway section is hot-formed on a hydraulic press by

Butt welds only hold this manway to its tank and cover.

means of a blank-holder and punch. Edges of the section and of its newly formed flue are then reduced by machine. Edges of the manway section, two straight, two curved, are butt-welded to corresponding surfaces of the tank.

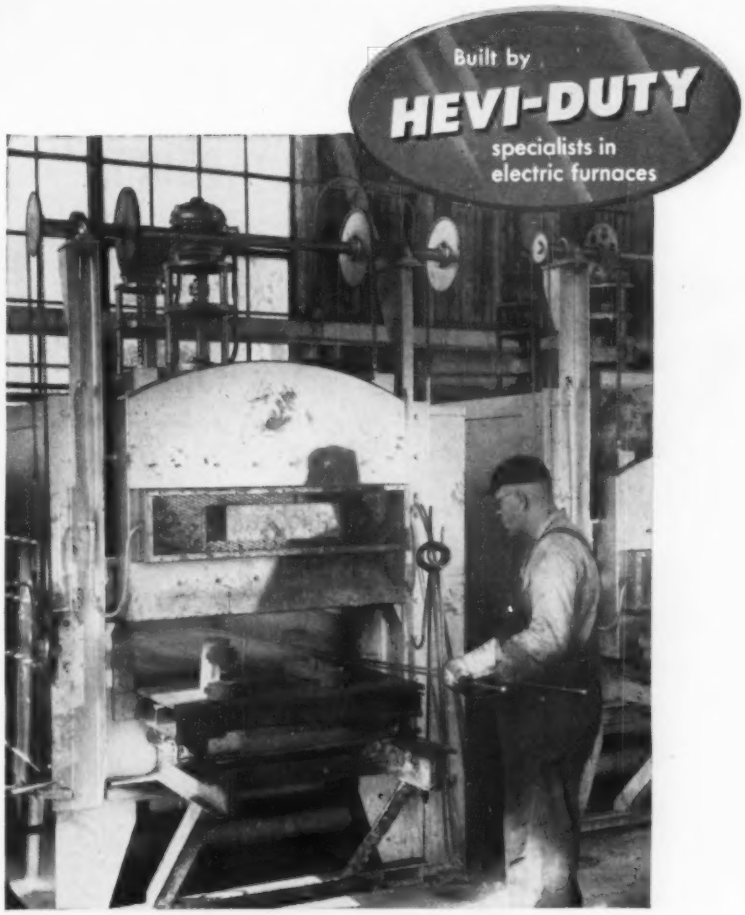
Uses Submerged Arc—The open end of the flue is butt-welded to a short cylinder which becomes the base of the manway cover. All welding is by the submerged arc method.

Following welding each seam is X-ray inspected inch by inch. It is at this point that the substitution of a hot-formed flue for the old-fashioned built-up manway joint permits 100 pct welding inspection.

Instruments

Gage measures levels inside large tanks of liquids

A leading aluminum producer has found a way to accurately measure levels inside large tanks containing super-saturated solutions of sodium aluminate. Sodium aluminate is the basic raw material desolved from bauxite clay in making aluminum.



Byron Jackson Division, Borg-Warner Corporation, hardens and tempers high-strength components for oil well tools in this Hevi-Duty box furnace

Steel parts processed by Byron Jackson, Los Angeles, face unusually tough tests. They are used in oil well tools where every additional foot of depth adds still further to the weight, strain and torsional stress. In one instance, this equipment drilled to a depth of 23,000 feet — the greatest depth ever attained to date.

Byron Jackson found that components both hardened and drawn in the Hevi-Duty Multi-Range furnace provided maximum high strength characteristics. The wide temperature range combined with precise, uniform control make this furnace ideal for both operations.

Write for Bulletin 341 for complete information on Hevi-Duty Multi-Range Box Furnaces.

- Heat Processing Furnaces
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TECHNICAL BRIEFS

Major problem in measuring the level of this solution or other similarly saturated solutions, is its tendency to precipitate continually on any measuring device inserted into the liquid. Level indicators employing mechanical or displacement measuring means sometimes become clogged and ineffective.

Uses Electro Gage—The aluminum firm, Reynolds Metals Co., Bauxite, Ark., installed an electromechanical recorder to measure the level inside a surge tank containing a sodium aluminate concentrate kept near the boiling point. Working with engineers of Robertshaw-Fulton Controls Co., New York, it installed a 14-ft long flexible probe inserted vertically into the tank through a 1-in. threaded connection.

Sheathed in durable plastic, the probe is made of ½-in. steel cable. It measures a 10-ft range of liquid with no adjustments. Installation didn't require emptying of the tank.

The user reports the gage has delivered high-level accuracy for more than a year, with no maintenance.

Handling

Automatic mixer feeds steel mills with quality coal

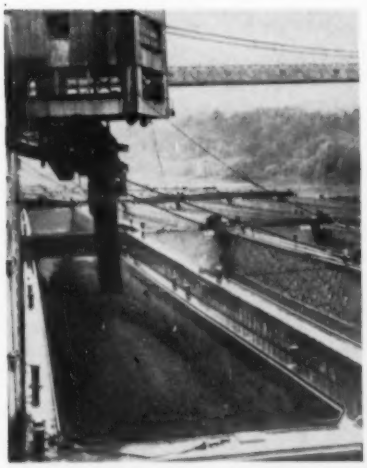
An automatic system accurately blends coal from two different sources prior to its use in large steel plants. Making use of a unique mixing and weighing setup, it supplies the mills with high grade metallurgical coal for coke oven use.

Even though the flow of coal from the mines varies considerably, the system keeps the mills' supply within 10 pct variations. At rare times 25 to 30 pct variations occur.

Barges To Mills—Supplying coal from two mines at East Fredericktown, Pa., to Jones & Laughlin Steel Corp.'s plants at Aliquippa and Pittsburgh, the electronic con-

tinuous proportioning unit was engineered and built by Trans-Weigh Co., Wayne, Pa. It makes possible control of flow of both coals, even though it's not economically feasable to control one of them alone.

Prior to the installation, barges transported coal from both mines directly to the mills. Now, they are automatically weighed and blended



Feeder loads prepared coal into barge headed for mill.

at the East Fredericktown preparation plant. Then barges take them to the mills. High volatile coal from one mine comes to the mixing plant via a 2000-ft long belt from a crushing and screening chamber 170 ft below ground level.

Control Now Practical — Coal from the other mine comes via barge and belt conveyor to ten bins with a total 5000-ton capacity. Flow from the first mine cannot be practically controlled; the second can. By keeping excess of the second, the system assures itself of accurate portions of each.

Weighing and blending operations are automatic. It weighs material on a short section of the belt, electronically measuring belt speed and multiplying these to get pounds per hour rate. When this varies on one flow, the system automatically makes a proportional change in the other. A recorder in his office lets the superintendent know what the situation is.

The automatic system does away with manual speed controls.

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Alloy Exhibits Strength At White-hot Operating Heat

Metals for missile, rocket and aircraft engines and other uses must withstand high temperatures. But a material to resist heat is not enough.

Castability, oxidation resistance, and stress-rupture strength are vital requirements. A new alloy appears to fill all these.

▪ Using a "predesigning" development method, metallurgists have come up with an alloy that exhibits outstanding strength at white-hot (1800°F) operating temperatures. Called Nicrotung, it contains nickel, chromium, and tungsten.

The alloy, explains Westinghouse Electric Corp., Pittsburgh, its developer, is a result of the firm's "predesigning" of materials from basic theoretical information rather than employing other time-consuming methods.

Still in Early Stages—The company emphasizes that the alloy is still in its initial stages of development as a high-temperature alloy. However, in early tests, it appears outstanding in basic requirements of an 1800°F operating material. It shows promise of being an excellent turbine blade material.

In addition to exhibiting high-strength at temperatures found in missile and rocket engines, the alloy appears to exhibit good castability, oxidation resistance, stress-rupture strength and ductility.

In Pilot Plant Run—The alloy has been prepared on a pilot plant scale at the Westinghouse materials manufacturing department at Blairsville, Pa. It's also being evaluated in jet engines at the firm's Kansas City turbine plant.

Breaking strength of the alloy at room temperatures is about equal to that of a good grade structural steel. However, at the near white-hot temperature of 1700°F, Nicrotung withstands a stress of 32,000 psi for as long as 100 hours without failure. At 1800°F, the alloy withstands a stress of 22,000 psi for this length of time.

Coating

Continuous, watertight film up to ⅛-in. thick can now be extruded over tubular and other forms via a new process. Perfected by Geauga Industries Co., Middlefield, Ohio, it's now used for covering electrical bus bars with insulation. It

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Want More Data?

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can have other applications (i.e., where atmospheric or moisture seals can be incorporated into structural members.)

The insulation goes on as a seamless, integral coat. Coverings can be butyl, GRS, Hycar, Neoprene and rubber in black or most colors.

Brazing

High visibility liquid flux for brazing gold, silver and platinum can be applied with a pipette, eye dropper, hypodermic needle or automatic metering devices. The new brazing material lets the brazier closely watch all heating and melting phases. Eutectic Welding Alloys Corp., Flushing, N. Y., makes it.

Maintenance

A new one-coat liquid treatment prevents "dusting" of concrete floors. Easy to apply and economical, its maker Maintenance, Inc., Wooster, Ohio, says the material penetrates deeply to bind small concrete particles together. It retards breakaway under traffic.

Insulation

A white insulating - finishing cement recently developed by Baldwin-Hill Co., Trenton, N. J., provides high dry coverage with virtually no shrinkage. Field tests of the spun mineral wool show 100 lb of it covers a 72 sq ft area, ½-in. thick. It dries with a hard, white finish.

Plating

Low cost platinum plating for high temperature and other exacting industrial applications is produced with a new material. It provides a pore - free platinum electro plate, in any practical thickness, directly from the bath in one continuous operation. Sel-Rex Corp., Nutley, N. J., makes it.

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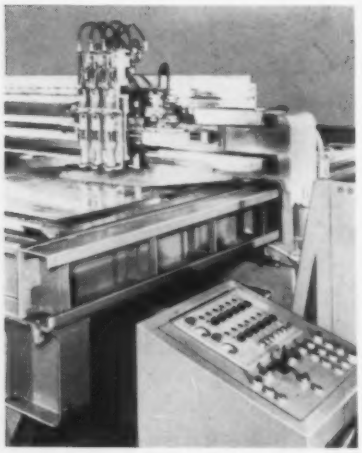


Numerically Controlled Drill Is Fast Worker

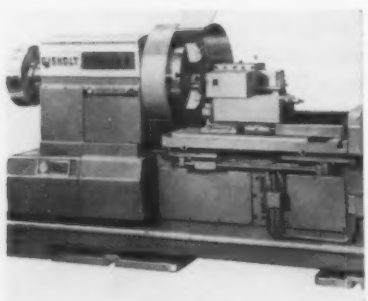
A numerically controlled drill that makes a hole every five seconds and positions to ±0.005 in. accuracy is now in production. The two-dimension, point-to-point, automated unit handles workpieces up to 8-ft wide, 16-ft long. Designed to eliminate template and layout time, the machine employs a gantry type drill carriage to conserve floor space. A three-unit drill head permits selection of three different sizes of drills or counter-boring tools. The unit is capable of simultaneously mounting two wing skins for F-102 delta-wing jet aircraft. Drill positions with respect to an "X" (200-in.) and "Y" (108-in.) axis are programmed by the engineering department. A stenographer using a "Flex-O-Writer" types the information; this device perforates a binary code on the 1-in. wide paper tape. A tape reader, decoder, stepping switch assembly and other controls operate the numerically controlled machine which automatically drills the holes at a rapid rate. (McKay Machine Co.)

For more data circle No. 47 on postcard, p. 141

Solar Furnace Develops 7000°F Heat Quickly

Using the sun as its power source, a new furnace starts heating within an instant after going into use. It develops up to 7000°F instantly. Being fully automatic, scientists and engineers using it can devote their time to observation and analysis of materials under test in the furnace. It eliminates many bothersome problems which can draw experimenters' attention away from testing. The furnace employs an automatic electronic solar tracking system. This maintains precise alignment of the parabolic lens with the sun. Solar heating has many advantages: it eliminates contaminating influences, such as electrical and magnetic fields, gases and chemicals. Inasmuch as no special crucible is necessary for the specimen being melted, there are no impurities to contaminate the molten residue. (Thermal Dynamic Products, Inc.)

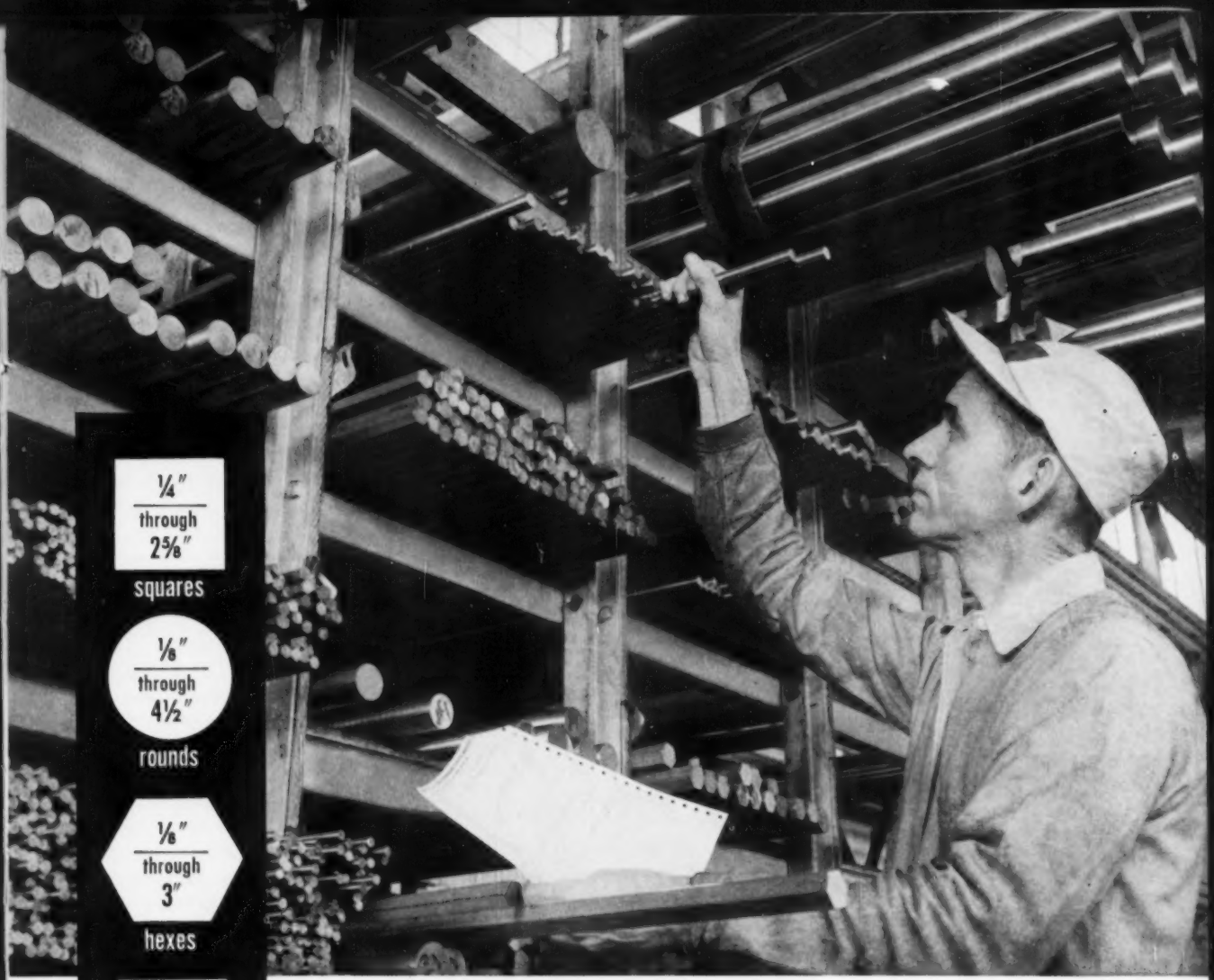
For more data circle No. 48 on postcard, p. 141



Automatic Lathe Has "Building Block" Features

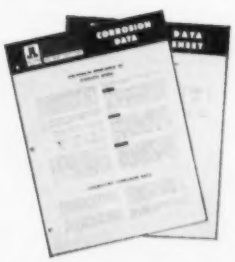
Known as "the original building-block" machine, this standard machine tool has a standard headstock, bed and wide platen table. Easy to set-up and maintain, the unit has a 36¼-in. swing over the bedways. Standard speeds range from 23 to 1257 rpm in selected stages. Its building-block reputation comes from this: As each specific job is tooled, standard chucks, tool slides and tool blocks are added. There's room for front, center, rear and auxiliary slides, all capable of moving at different feed rates. (Gisholt Machine Co.)

For more data circle No. 49 on postcard, p. 141



Steel Service Centers are served better from J & L's Master Stock of Stainless Steel

To better serve its warehouse customers, J & L's Stainless Steel Division in Detroit master stocks hundreds of tons of finished stainless steel bar and wire for prompt delivery. This stainless steel bar and wire stock is available in sizes and shapes to meet customer requirements and specifications.



Write for these Technical Data:
1. Laboratory Corrosion Data.
2. Data Sheets, (please specify the grades in which you are interested).

Improve your Products with . . .
J&L STEEL STAINLESS
BAR • WIRE • SHEET • STRIP

Jones & Laughlin Steel Corporation • STAINLESS STEEL DIVISION • Box 4606, Detroit 34

Gear Hobbing Machine Is Completely Automatic

Fully automatic, this gear hobbing machine hobbs spur, helical or worm gears; worms; or any similar generated profile. Use of a magazine feed attachment provides fully automatic loading, chucking and machining. As a result, handling time is cut considerably. The operator needs only load the magazine and check finished pieces, enabling him to tend several machines if desired. For small runs, the machine operates semi-automatically; opening of the chucking device can be controlled by a foot pedal. The machine can also be equipped with a manufacturing program control providing pre-selection by control switches for either longitudinal hobbing, plunge hobbing or combined plunge-longitudinal hobbing. Maximum number of teeth it cuts is six. A special attachment allows cutting of less than six to single-start worms. Maximum diameter blank is 5⅛ in. (Cosa Corp.)

For more data circle No. 50 on postcard, p. 141

Tracer Attachment Fits Any Lathe

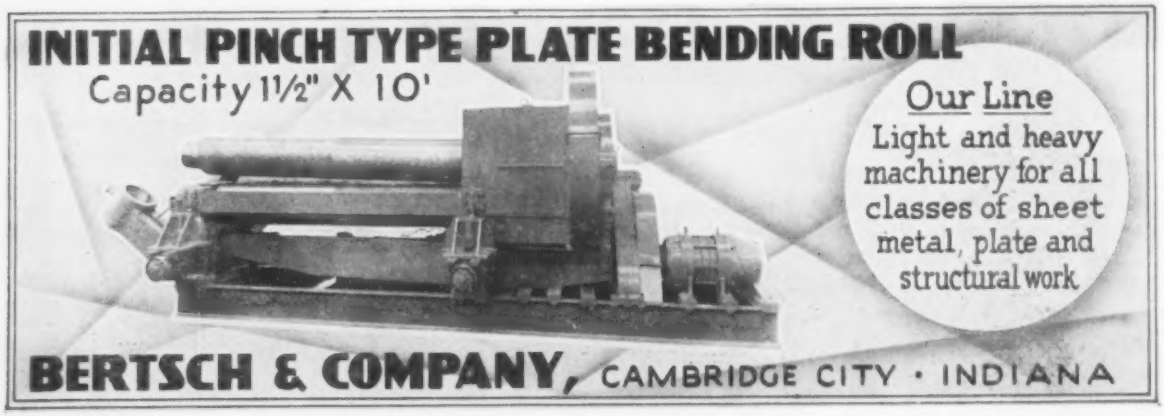
This lathe tracer attachment provides wide versatility. For use by both skilled and unskilled operators, it is based on a precision hydraulic 180° single dimension tracer. The attachment adapts to virtually any make lathe. It allows relatively unskilled labor to perform such turning applications as step shaft tracing, contour turning, and facing operations. The attachment converts standard lathes to contour machines. Yet, it still allows normal turning by the lathe. Cross and longitudinal screws are kept intact. Cross and tool slides are cast of Meehanite and finished to precision tolerances. Other features: ability to use round or flat templates; self-contained hydraulic power unit; and the exclusive fluid metering valve on the control cylinder. (True-Trace Sales Corp.)

For more data circle No. 51 on postcard, p. 141

Cutting Tips Give High Cutting Efficiency

Three new, two-piece cutting tips are designed to get high cutting efficiency from petroleum, natural and city gases. One type is for general hand cutting; a second for fast preheating and general cutting; the third for speed tip machine cutting. Sizes range from 00 thru 8. (Victor Equipment Co.)

For more data circle No. 52 on postcard, p. 141

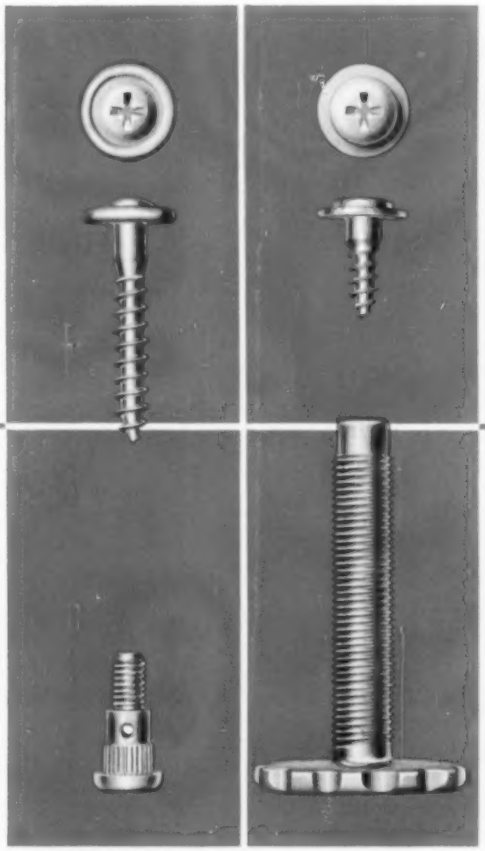

INITIAL PINCH TYPE PLATE BENDING ROLL
Capacity 1½" X 10'
Our Line
Light and heavy machinery for all classes of sheet metal, plate and structural work
BERTSCH & COMPANY, CAMBRIDGE CITY • INDIANA

KEYSTONE XL WIRE

solved heading problems for

NATIONAL LOCK COMPANY
ROCKFORD, ILLINOIS

ONE Replaces TWO . . . by cold heading this Phillips washer head screw, National Lock replaced an oval head screw and finishing washer at a substantial cost savings. Regular wire caused cracked heads and required 100% inspection, so National Lock turned to Keystone "XL" Wire and eliminated cracking.



DESIGN PROBLEM SOLVED . . . this was an unsatisfactory 2-piece assembly, and a 1-piece Phillips washer head shoulder screw appeared to be needed. However, the design seemed too severe for cold heading. National Lock made this part a production item with Keystone "XL" Wire . . . and at a savings.

QUALITY AND QUANTITY . . . National Lock found it possible to have both when using Keystone "XL" Wire to economically produce this knurled shoulder screw. This part required a wire which could withstand a very severe extrusion and still fill out a sharp knurl to keep the part from turning in application.

INCREASE DIAMETER . . . National Lock reports this 1-piece cold headed leveling screw serves the same purpose as a 2-piece welded assembly, and the scalloped head fits 12-point socket wrenches. The use of Keystone "XL" Wire permits an increase in head diameter and a great reduction of cracked heads.

flowability IS THE SECRET

Illustrated above are four ways National Lock Company, Rockford, Illinois, has profitably put Keystone "XL" Wire and its *flowability* in action. Your Keystone representative will be glad to assist you in finding a solution to your heading problems. See him soon or write direct.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE
WIRE FOR INDUSTRY

Keystone Steel & Wire Company
Peoria 7, Illinois

COLD HEADING FACTS FOLDER . . . send coupon today! New folder discusses uses, applications, methods, technical facts, wire requirements.

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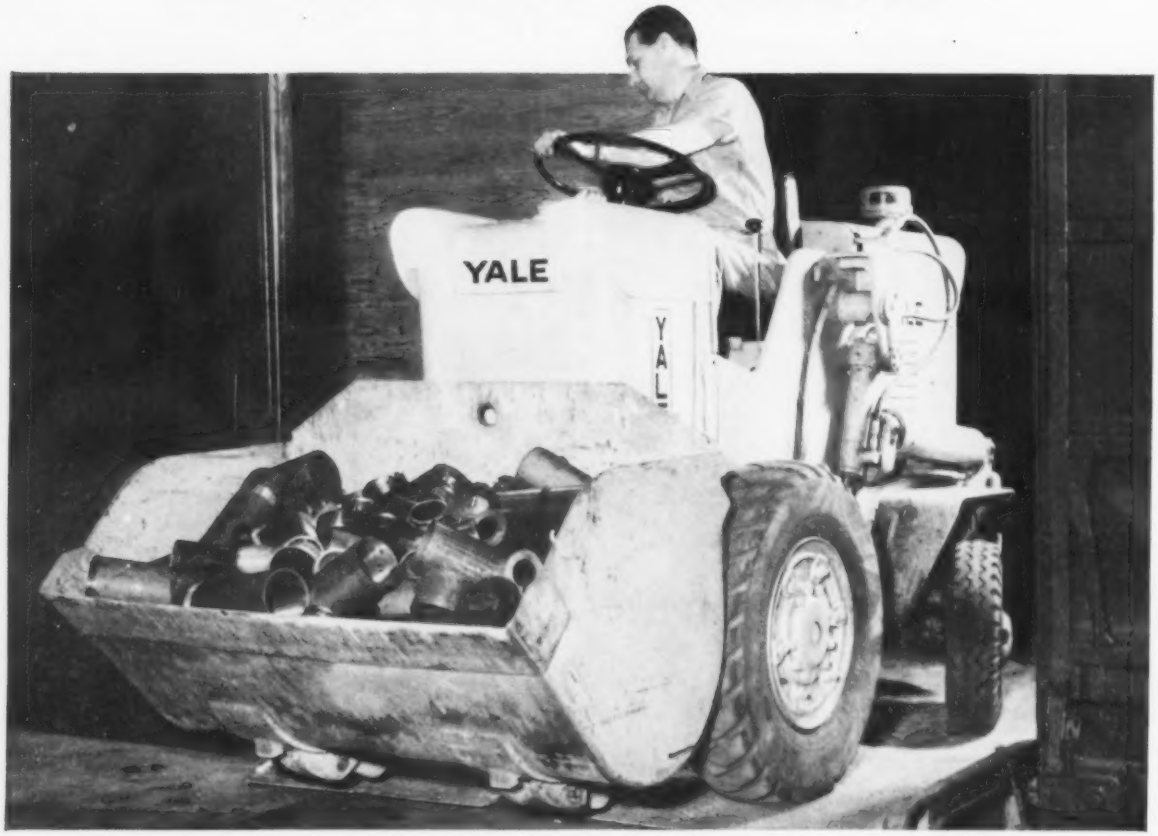
NEW YALE INDUSTRIAL TRACTOR SHOVEL



Carries more tonnage every hour

—field tests prove it!

Actual field tests prove the amazing work-capacity of the new Yale Industrial Tractor Shovel. Extra tonnage—extra work—extra duty cycles! Operating acceleration speed is 8 mph in 3.5 seconds. And Yale's exclusive fully automatic Torque Transmission produces quicker, smoother starting, more power under load conditions.

Loader-linkage advantages are unique. Exclusive 45° ground-level tipback provides top loading action, minimum spillage in grade-level position. Exclusive 6′ dumping clearance (highest on any model of similar wheelbase) automatically returns bucket from full dump position to dig position.

Let your operator work with it. He'll like the roomy, clear cockpit—the finger-tip controls—the ease of handling—the fact that there are no gears to shift. He'll especially like Yale's exclusive Safety-Curve Arms—that never rise above the side frame to cause injury. For a demonstration in your plant or further data write The Yale & Towne Manufacturing Co., Philadelphia, Pa., Dept. A-946.

COMPARE THESE YALE FEATURES:

- Exclusive Yale Torque Transmission (fully automatic)
- Exclusive 45° ground-level bucket tipback
- Exclusive 6′ dumping clearance
- Exclusive Safety-Curve Arms
- Exclusive acceleration speed to 8 mph. in 3.5 sec.
- Exclusive sealed brakes
- Exclusive forward and rear operating lights
- 2500 lbs. carrying capacity
- Short wheelbase for minimum turning radius
- Gasoline or LP-Gas powered

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INDUSTRIAL LIFT TRUCKS & TRACTOR SHOVELS • HOISTS

GASOLINE, ELECTRIC, DIESEL & LP-GAS INDUSTRIAL LIFT TRUCKS • WORKSAVERS
WAREHOUSERS • HAND TRUCKS • INDUSTRIAL TRACTOR SHOVELS • HAND AND ELECTRIC HOISTS

YALE MATERIALS HANDLING DIVISION, THE YALE & TOWNE MANUFACTURING CO. MANUFACTURING PLANTS: PHILADELPHIA, PA.; SAN LEANDRO, CALIF.; FORREST CITY, ARK.

Test Machine

A new 1,000,000-lb. capacity hydraulic universal testing machine employs four screw columns. For testing complete aircraft sections, the four screws provide stability for all loads up to full capacity. The machine has a 63-in. clearance between screws. It accommodates specimens up to 18-ft high in tension or compression. A heavy-duty hydraulic loading system has a full 18-in. stroke. (Tinius Olsen Testing Machine Co.)

For more data circle No. 53 on postcard, p. 141

Magnetic Inspector

Lightweight and portable, this magnetic inspection device effectively detects surface and sub-surface defects in ferro-magnetic material. Its portability makes it feasable to take it to the work instead of bringing the work to it. Weighing just 23 lb, it consists essentially of a U-shaped 110-v electro magnet. This operates at .175 kva on 110 volts. (Ferro Machine & Tool Corp.)

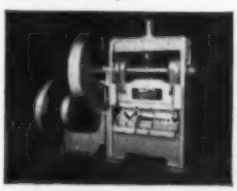
For more data circle No. 54 on postcard, p. 141

Barrel Plater

Barrel platers for production chrome plating consist of a chrome plating barrel, an exhaust blower, a flexible pipe connector, a 50-gal solution storage tank with a motor driven pump for circulation, three 2000-w electrical immersion heaters thermostatically controlled, a push-button control box, an overload

IN THE BEATTY FAMILY OF FINE METAL-WORKING EQUIPMENT YOU'LL FIND MACHINES FOR BENDING Z STRAIGHTENING — SHEARING FLANGING ⅂ V-BENDING PRESSING AND NOTCHING

BEATTY No. 7 Detail Flange Punch speeds single hole flange punching; eliminates end-for-end turning of beams. 100-ton cap.



BEATTY Guillotine Bar Shear for angles, bars, rounds, squares without changing tools.

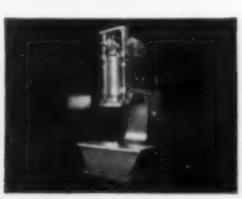
Got a metal-working problem? Chances are, from the Beatty family of metal-working equipment you will find the *right* machine for the job. Right in cost . . . right in production speed . . . right in engineering concept.

Beatty machines have an enviable reputation for accurate, dependable, day-in-day-out operation. They're built rugged and rigid to keep downtime at a minimum — boost production. Don't let obsolete equipment rob *you* of production and profits. Get all the information on a Beatty installation to fit your needs . . . talk it over with a Beatty engineer.

BEATTY MACHINE & MFG. CO.
936 150th St., Hammond, Indiana

BEATTY Guillotine Beam Flange Punch for flange punching of beams. Built-in adjustable tools save set-up time. 200 ton cap.

BEATTY Guillotine Beam Punch punches webs and flanges in I-beams from 6 to 30 inches.



BEATTY Gap Type Press for forming, bending, flanging, pressing. 250 ton cap.

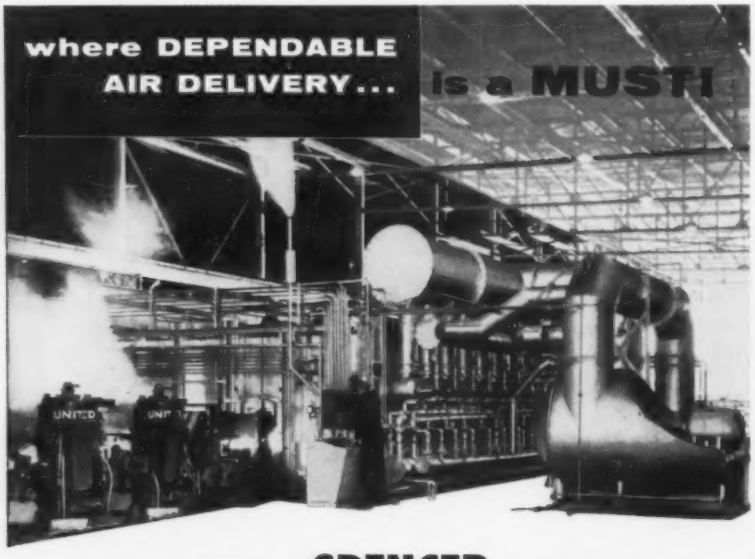
protection switch, two plating baskets and two anodes. Motors are 220 - v, 60 - cycle, 3 - phase. (The Dawson Corp.)

For more data circle No. 55 on postcard, p. 141

Two-way Saw

Automatic panel saws now available have an additional motor which retracts the saw carriage at high speed at the completion of a slower cutting pass. Carriage travel speeds are infinitely variable between 8 and 50 fpm; the carriage retracts to its starting position at this same speed. Actually, it's possible to cut certain stock on both passes, thereby doubling production. (The Hendrick Mfg. Corp.)

For more data circle No. 56 on postcard, p. 141



...reliable SPENCER blowers

Time after time, men who know specify SPENCER
—for original equipment or replacement.

Proven dependability is the reason. Simple construction, constant pressure at varying volumes, mounting that requires no special foundations—these are some of the reasons why SPENCER IS PREFERRED.

Whatever your requirement in blowers—from ⅓ to 1,000 H.P., volumes up to 20,000 CFM, pressures from 4 oz. to 10 lbs., it will pay to check with SPENCER.

Photo shows 60 Ton Billet Heating Furnace installed at the Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div., Buffalo, N.Y. A SPENCER 100 H.P., 1750 RPM Turbo Compressor rated 18,000 CFM at 12 oz. pressure furnishes combustion air.

Request Catalog 126-A containing complete specifications.

The SPENCER TURBINE COMPANY
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OTHER QUALITY SPENCER PRODUCTS

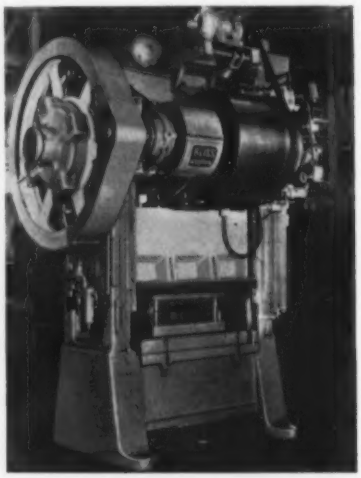
STATIONARY VACUUM SYSTEMS

PORTABLE VACUUM CLEANERS

PNEUMATIC CONVEYING SYSTEMS

Electronic Press Drive

Completely electronic, a new press drive makes possible some unique press workings. The drive permits reverse jogging of a press without need for stopping and reversing the motor. Thus, it's possible to back away at once, saving considerable time when setting large dies. In addition, bottoming dies may be brought together with an easy reverse jog and pulled out sharply by normal jog. Jogging torques and speeds are adjustable. The control also permits new combinations of approaching, working and return speeds to meet constantly increasing production requirements. For example, it permits a rapid advance to the work,



compensated automatic slow down to prevent tearing blanks, and a fast return. A slight twist of a dial provides the compensation necessary for a difficult job or a poor load of material. (E. W. Bliss Co.)

For more data circle No. 57 on postcard, p. 141

Vacuum System

Designed for laboratory and pilot plant use, a packaged vacuum pumping system is suited for development of new high vacuum applications in metallurgical processing, production of electronic components, and environmental testing. The unit is also useful in any high vacuum research. Its basic unit includes a diffusion pump, a mechanical pump, and three valves

which permit rapid cycling. Two models are available with a choice of mechanical pumps. One, with an ultimate pressure of 6 x 10^{-6} mm Hg reaches a pressure of 3.2 x 10^{-5} mm in 12 minutes. Another reaches an ultimate pressure of 3 x 10^{-5} mm Hg in 6 minutes. The top

flange face of a special 4-in. VST gage valve mounts slightly above the top of the cabinet. This speeds connection to the system to be evacuated. The flange face is grooved for an o-ring gasket and is blind-tapped for installation. The metal cabinet has removable front, rear and right-side panels for fast, easy access to the pumps. A sloped front panel contains electrical controls and pilot lights as well as two knock-out panels for the installation of optional vacuum gauges. (Rochester Div., Consolidated Electrodynamics Corp.)

For more data circle No. 58 on postcard, p. 141

Epoxy Resin

Readily carved with standard hand tools, a tough new epoxy resin can be fabricated into models and patterns. Sturdy but inexpensive, such models and patterns display good dimensional stability, chemical and moisture resistance. Of course, graining difficulties are non-existant. (Marblette Corp.)

For more data circle No. 59 on postcard, p. 141

Micrometer Head

A new micrometer head is designed for use in electronic equipment requiring ultra-fine adjustment. It's also for use with machine tools, fixtures, special gages and tools where micrometer accuracy in settings and adjustment is necessary. The device reads directly in ten-thousandths of an inch and has a 1-in. range. An important feature is a new constant-pressure nut which makes possible a wide range of tension adjustment from light to heavy to suit requirements. (L. S. Starret Co.)

For more data circle No. 60 on postcard, p. 141

Machine Control

A synchronous motor-driven timer recently developed comes with one, three and five minute timing units. It includes many new design features for machine tool applications. A wide range of settings is offered by this timer. The one minute unit adjusts in one second increments, 0 to 60 seconds; the three minute unit adjusts in

WORLD'S FINEST DC WELDERS

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MODEL SRH

MODEL SR

Only 30¼" high, the new Gold Star SRH combines compactness with the sensational improvements introduced by the Miller Gold Star line. These include wholly new transformers, completely sealed semimetallic rectifiers and weld stabilized circuits. Where stacking or paralleling adaptability plus the finest dc performance ever achieved is indicated, the Gold Star SRH is the unequaled answer. Available in three models with 60% duty cycle ratings of 200, 300 and 400 amperes.

The best welding current **ever** produced is delivered here. You **get** maximum arc stability for sounder, denser welds with **all** electrodes in **all** positions. And you get more of them in less time! This revolutionary performance coming from a machine of record-breaking dependability (see January welding magazines), has led industry and individuals to say of the Miller Gold Star SR-DC: "The SR gives **perfect** dc welding current; Easiest arc starting — bar none; Smoothest arc I ever used, and quiet to boot."

GOLD STAR DC-SR

Available in both duplex and single models with ampere range from 200 to 1200. Complete complement of control equipment gives the Gold Star SR unlimited flexibility, plus milestone performance and unmatched dependability.

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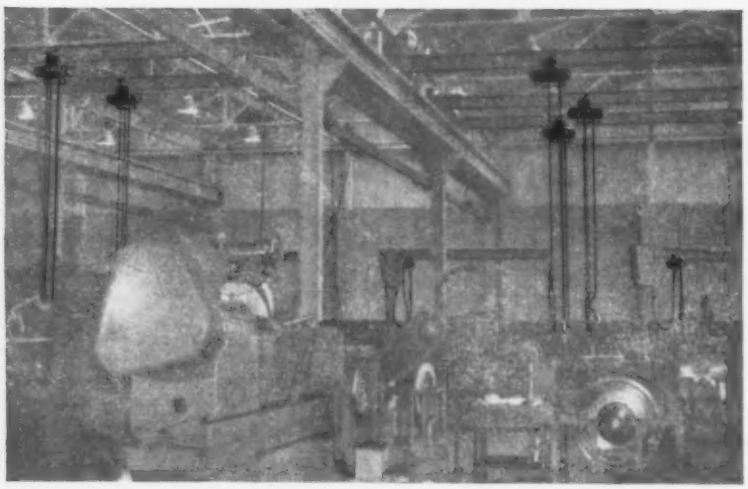
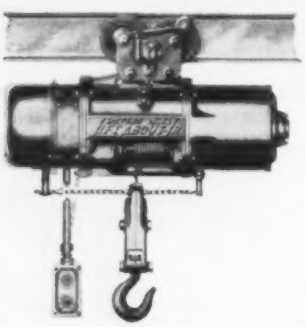
Moves more material and work-in-process

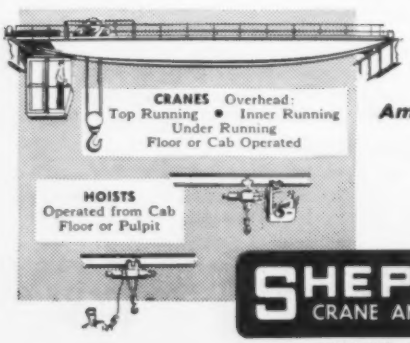
AT LOWER COSTS





ELIMINATE costly manual lifting and lugging . . . speed raw materials, work-in-process and finished products along your production line with a Shepard Niles LiftAbout, Jr. Low in cost, this rugged hoist will give many years of thrifty, dependable service.

Available in 250, 500, 1000 and 2000 lb. capacities . . . parallel or cross-mounted with bolt, hook or trolley suspension. Send for the LiftAbout, Jr. bulletin today . . . or ask to have a Shepard Niles representative call—there's NO OBILGATION.



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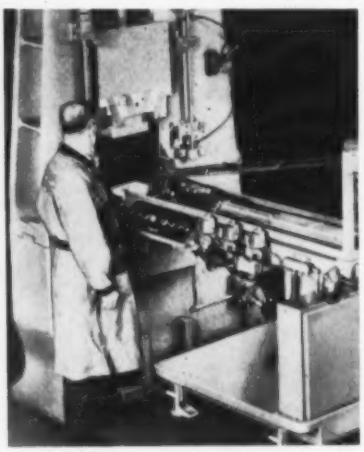
three second increments, 0 to 180 seconds and the five minute unit adjusts in five second increments, 0 to 300 seconds. (Cutler-Hammer Inc.)

For more data circle No. 61 on postcard, p. 141

Feed Device

Semi-automatic re-strike or coining of forgings is provided by a new type feed. Used with a new electrically controlled piston-lift, gravity drop hammer, the feed is especially designed for coining



operations. Mounted on a movable base, it adjusts to suit various die heights. If access to the die area is necessary, as for die changes, the feed easily swings out of the way. (Chambersburg Engineering Co.)

For more data circle No. 62 on postcard, p. 141

Automatic Bender

Push button controlled, a new unit bends sheet metal up to 180° with a radius of bend from ¼ to 3 in. Its capacity is 42-in. wide sheets. (Klaas Machine & Mfg. Co.)

For more data circle No. 63 on postcard, p. 141

Spot Welder

A new single phase rocker arm spot welder stands up under rugged shop conditions. It possesses standards of materials, design and construction ordinarily found in welders built to aircraft industry

standards. The frame is unusually rigid; control is transistorized with plastic coated printed circuitry and plug-in components. Welders are available in standard "O" size frame, with 30 or 50-kva transformers. (Sciaky Bros., Inc.)

For more data circle No. 64 on postcard, p. 141

Hydraulic Wrench

Hydraulically operated, a new impact wrench has a 1-in. sq drive. It exerts up to 1000 ft-lb of torque. The 6.5-gpm hydraulic power source works at 1000 psi. This produces about 1200 impacts per minute. Free speed is 650-700 rpm. (Owatonna Tool Co.)

For more data circle No. 65 on postcard, p. 141

Magnet Vise Jaws

Soft magnetic vise jaws for protecting certain shop work can replace "home-made" jaw caps of scrap, lead, brass, etc. These handy new caps hold to any steel surface. They fit right onto the vise jaws. And they can be kept conveniently within reach of the job. This instead of hunting all over the shop for a piece of soft scrap. (Severance Tool Industries, Inc.)

For more data circle No. 66 on postcard, p. 141

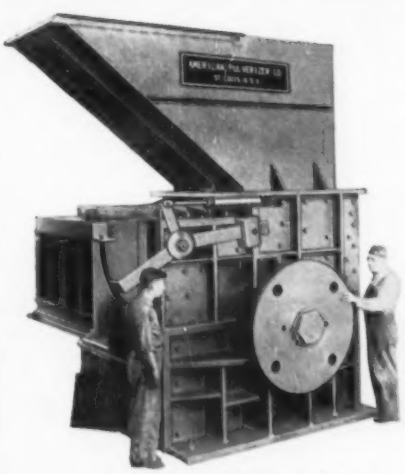
Furnace

Using a high-purity brick for its heating chamber lining, a hump-type belt furnace eliminates need for a metal muffle. Designed for heats to 2100°F (depending on mesh belt and loading limitations) the furnace serves high production bright annealing, brazing and atmosphere quenching of stainless steels, and applications requiring a low dew point atmosphere. Its hump-type construction saves atmosphere gas. It also provides bright, oxide-free results. Protective atmosphere gas consumption inside the elevated heating chamber is kept at a low level because of the hump-type design. Belt widths from 12 to 36 in. and heating chambers up to 12-in. high are available. (General Electric Co.)

For more data circle No. 67 on postcard, p. 141

it takes an AMERICAN

to CRUSH SCRAP LIKE THIS!



In an hour this capable American Rolling Ring Crusher reduces as much as 50 tons — a carload — of metal turnings . . . or 10 to 20 tons of aluminum castings and or stampings.

It's the American-originated rolling shredder rings of manganese steel that make it possible. Soundly engineered throughout, this 60-50 crusher is fully capable of handling large-scale primary reduction. Whatever your requirements there's an American that matches your need . . . from 10 tons per hour up to 50 tons per hour.

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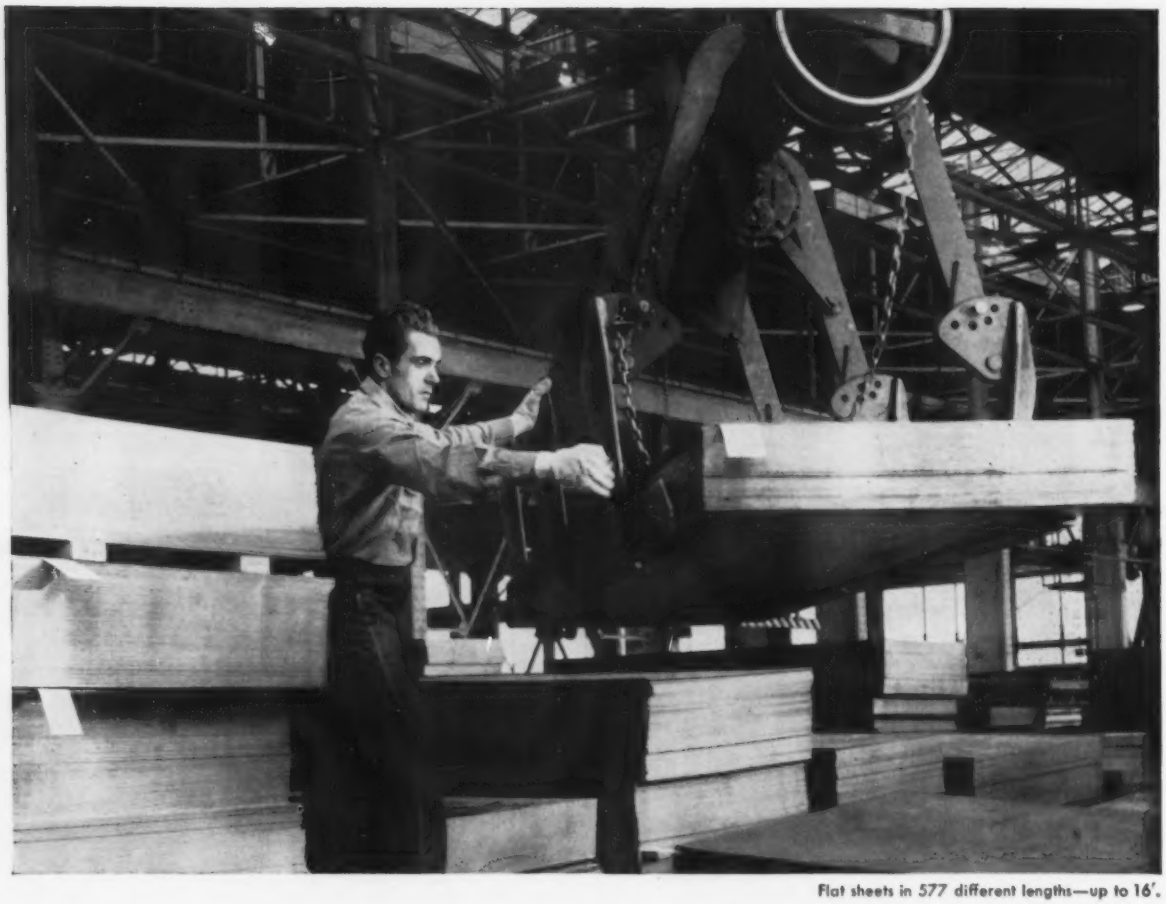

Flat sheets in 577 different lengths—up to 16'.

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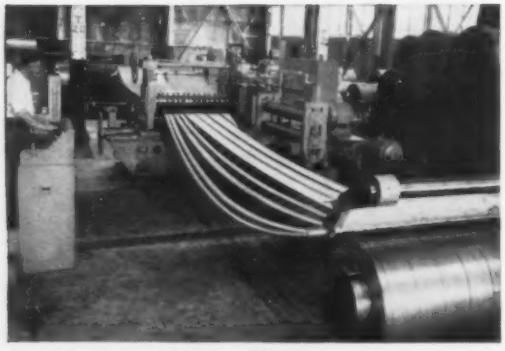

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The Iron Age Summary

Price Hedging Behind Upturn

Steel buyers apparently are convinced prices will rise due to wage hike.

Eisenhower indicates he has no intention of imposing wage-price restraints.

▪ Steel mills this week report an upsurge in demand. But it's probably just a flash in the pan. Much of the new ordering represents hedging against a probable price hike in July. Steel users figure they have nothing to lose and a lot to gain. Their inventories already are scraping bottom. So they're ahead of the game by buying now and beating a price boost.

There's little or no chance of anything happening to head off an expected steel price increase. President Eisenhower has indicated the Administration will not consider wage or price controls at this time.

Buyers Cautious — Under their contracts with the United Steelworkers of America, the mills' employment costs are due to rise an estimated 20¢ an hour on July 1. Indications are that a price increase of between $5 and $6 per ton will follow.

Meanwhile, steel buyers are beginning to pay closer attention to the market. They've had things pretty much their own way for months, but they know the picture can change overnight. The expected July dip could be just a prelude to a steady upturn that could catch the unwary off guard.

Temporary Pinches Feared— One purchasing agent told The IRON AGE:

"I have plates ordered for June 15 delivery. It's possible that I might not get them until July 15. This thing could change that fast."

While there is no thought of a serious bind in most steel products, buyers must be alert to temporary pinches in the market. The mills have plenty of overall capacity, but they are not inclined to make overnight changes in their schedules to meet momentary surges in demand.

Granite City's Move—The steel order upturn is spread across a broad cross-section of products with the exception of oil country goods. In some cases orders for the past two weeks were running 30 to 40 pct ahead of April. This means that shipments will show substantial strength during the rest of this month.

Granite City Steel Co.'s $2 per ton price cut is not likely to have far-reaching consequences, according to steel market analysts. It's more of a regional competitive move that will give Granite City the lowest delivered price in the St. Louis area and require freight absorption by mills going into that territory. Prior to the cut, the company's $4 differential meant it was slightly higher on truck shipments to St. Louis plants than Chicago mills with barge shipments. The change will put Granite City about 50¢ under Chicago mills on this basis.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 1,641	Last Week 1,567	Month Ago 1,334	Year Ago 2,240
Ingot Index (1947-1949=100)	102.0	97.5	83.0	139.4
Operating Rates				
Chicago	70.0	66.5*	55.0	88.0
Pittsburgh	58.0	55.0*	49.0	88.0
Philadelphia	59.0	59.5	55.0	102.0
Valley	44.0	40.5*	37.0	72.0
West	80.0	80.0*	70.0	101.0
Cleveland	35.0	35.0	27.0	88.0
Buffalo	54.0	49.0*	34.5	95.0
Detroit	63.0	55.0*	34.0	98.0
South	67.0	67.0	65.0	93.0
South Ohio River	54.0	56.0*	28.0	89.0
Upper Ohio River	76.0	80.5*	70.0	92.5
St. Louis	97.0	88.0*	82.0	89.5
Northeast	31.0	31.0	31.0	66.5
Aggregate	...	58.1	49.4	87.5

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.967	5.670
Pig Iron (Gross ton)	$66.49	$66.49	$66.49	$66.56
Scrap, No. 1 hvy (Gross Ton)	$36.00	$35.33	$32.00	$54.83
No. 2 bundles	$26.83	$26.17	$23.17	$43.17
Nonferrous				
Aluminum ingot	26.10	26.10	26.10	27.10
Copper, electrolytic	25.00	25.00	25.00	32.00
Lead, St. Louis	11.30	11.30	11.80	14.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	94.50	94.625	94.00	98.375
Zinc, E. St. Louis	10.00	10.00	10.00	11.50

Conveyor Sales Due for Rebound

Suppliers are optimistic despite the present decline in capital goods spending.

They believe users will want to up-date materials handling equipment as soon as conditions improve.

▪ Conveyor manufacturers have been hurt by the decline in capital goods spending. But, looking beyond the current sales slump, they find reason for optimism.

The conveyor builders are convinced their industry has a "built-in assurance" of continued growth.

Here's how one conveyor maker looks at the present and the future: "We're experiencing a momentary lull in business because industrial expansion has slowed down. However, this is just a leveling-off period. The general long-range trend is definitely upwards. The present slowdown doesn't affect our overall prospect of increasing sales."

Widening Market—This confidence is rooted in the belief that conveyors will make continued contributions toward ever-better materials handling. Equipment makers are convinced their products will find wider uses in an increasing number of applications. Plant management, they point out, is always interested in the savings gained through more efficient handling of materials. When industrial equipment buyers regain their confidence, conveyor makers say, this interest will be translated into new sales orders.

Meanwhile the conveyor market is slow. At the present level of activity it will be difficult for 1958 conveyor shipments to equal the all-time record high of $370 million established in 1957.

Most manufacturers surveyed by The IRON AGE report sales are down, backlogs have been cut, and deliveries are current.

Shipping Estimates — Standard conveyors can now be shipped very quickly. One manufacturer requires only a week to fill standard wheel or roller conveyor orders. The same firm lists delivery of wheel or roller conveyor systems at three to four weeks. Belt conveyor delivery is estimated at three weeks. And four weeks are needed when heavy duty or live roller conveyors are ordered.

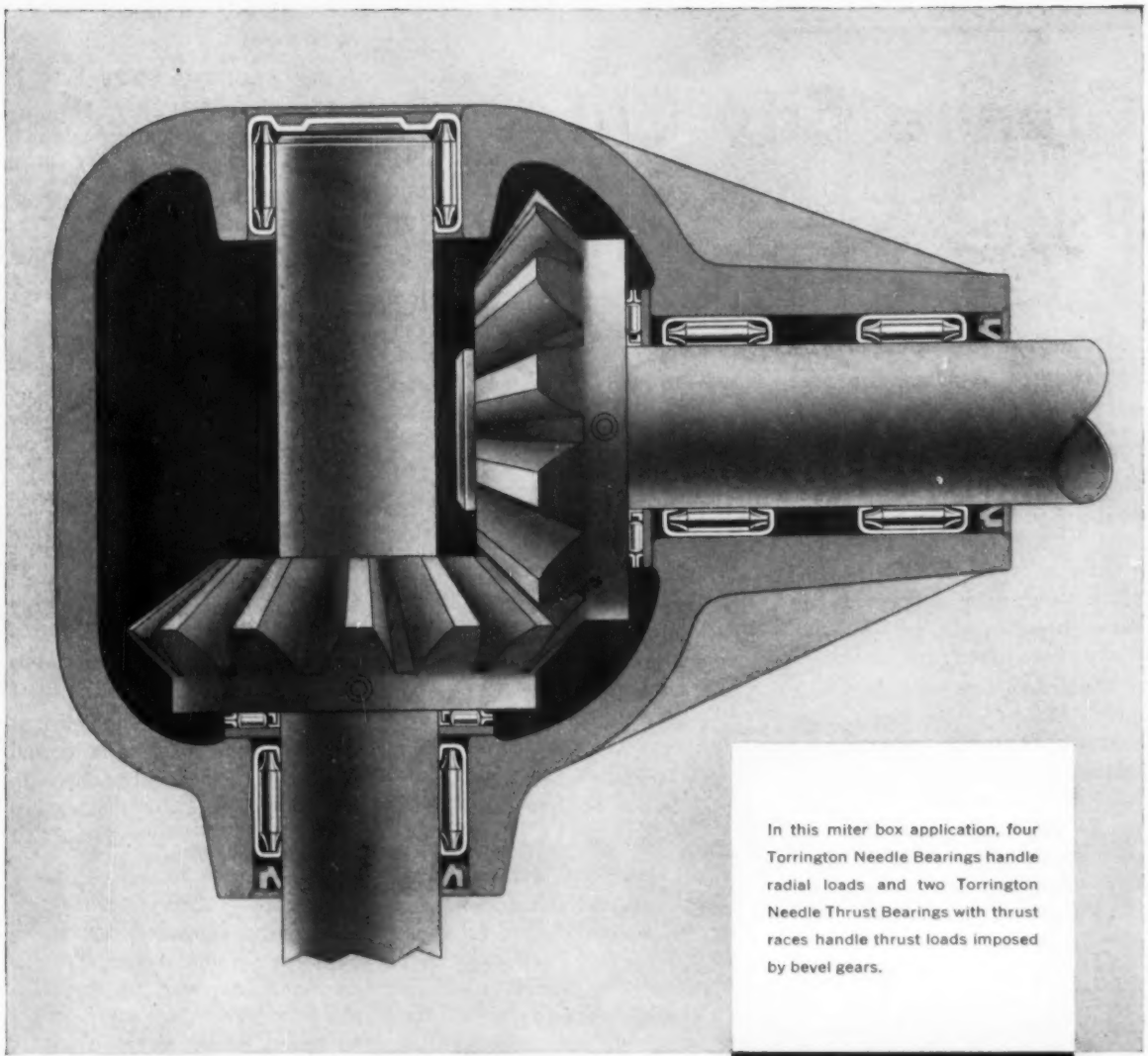
Price Changes Unlikely—Opinion among conveyor suppliers on price changes is mixed. Some state flatly that there will be no upward revisions this year. Others, while believing price rises are unlikely, qualify their stand a little.

"Price outlook will depend on potential cost increases in labor and materials," says one manufacturer. The consensus is that prices will stay at present levels during 1958.

Handling Trends—New trends in materials handling are being closely studied by conveyor designers. They are gearing equipment to fit in with such progressive handling concepts as live storage and perimeter feed. In live storage raw materials or parts are kept near production lines, possibly circling them on overhead conveyors. With this system they can be obtained when wanted with storage space cut to the minimum.

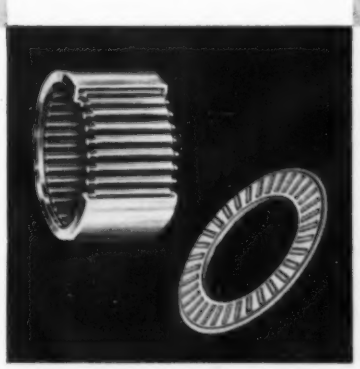
For perimeter feed, the plant layout is arranged so material flows quickly and smoothly from an outer perimeter toward the areas of use.

ORE CONVEYING: Rubber impact troughing idlers cushion Link-Belt conveyor from shock caused by large lumps of ore being discharged from feeders. Idlers are used for 600 ft along dock conveyor.



In this miter box application, four Torrington Needle Bearings handle radial loads and two Torrington Needle Thrust Bearings with thrust races handle thrust loads imposed by bevel gears.

Perfect Combination for Thrust and Radial Loads



Here's a space-saving, cost-saving way to handle high thrust and radial loads. Just team up Torrington Needle Bearings with Torrington Needle Thrust Bearings!

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Granite City Cuts Bases $2 a Ton

St. Louis area producer moves to retain price advantage over out-of-the-area mills.

Steel sales due for seasonal slowdown in July following recent order flurry.

▪ Granite City Steel Co.—paring its geographical price differential over out-of-the-area producers—has lowered its base prices $2 a net ton.

The move, effective May 30, gives Granite City the lowest delivered price in the St. Louis area and requires freight absorption by mills going into that territory. The previous $4 differential meant the company was slightly higher on truck shipments to St. Louis users when compared with Chicago mills shipping by barge.

The reduction applies to hot-rolled sheet, cold-rolled sheet, enameling sheet, galvanized sheet, culvert sheet and plate, f.o.b. Granite City, Ill. (For new prices see pp. 181 and 182 of this issue.)

In making the change a Granite City spokesman declared it will mean a saving for users of flat-rolled steel products in the mid-America area served by the company. In addition it is expected to assure that Granite City will retain its dominant position as a supplier there.

Also announced: Granite City will discontinue its functional allowance to distributors on galvanized corrugated roofing and siding.

Slow July Due—This week there was evidence that the recent flurry in steel orders will soon run into a seasonal snag. Small tonnage orders bolstered mill orders last month and this. However, buying to beat steel price increases is about over. Also the recent re-filling of depleted inventories by customers is due to taper off. And many steel-using plants will have reduced needs for steel as vacations curtail their operations.

As a result a slow July looms for steel sellers. Buyers, however, are keeping close touch with the market, ready to boost their orders if mill deliveries stretch out. Operating on low inventories they can't afford to be shut out if demand shows a spurt. They know the current level of mill operations won't allow producers to give them extra tonnages in a hurry.

Sheet and Strip—Hedge buying has improved mill order books for June, but a sharp drop in July tonnage appears sure. Auto companies are still placing sizable orders, as high as 30,000 tons, apparently for '58 car model production. After these orders taper off the mills will look ahead to requests from the automakers for August tonnages to be used for 1959 models.

Price buying by **Chicago** district users will mean carryovers on cold-rolled sheet and wide hot-rolled sheet into July. Galvanized sheet continues in good demand in most market areas.

Plates and Shapes — Plate users are keeping a close eye on the market, watching for any signs that mill deliveries might lengthen. The prospect is not too strong, however, as many mills are operating at only ten turns a week. They could increase production above this level without wide-scale rescheduling of work.

Structural fabricators are also keeping stocks low and placing orders for quick delivery. In some cases they must go to warehouses because mills cannot supply the steel as quickly as it is needed.

Bar — Hot-rolled bar continues stronger than cold finished. Cold finishers see little hope for any rapid improvement in their market. They point out that vacations are coming and new auto model production is still a couple of months away.

Some mill schedules for June hot-rolled bar were still open at the end of May, but filling fairly rapidly. In the **Midwest,** heavy rounds over 6 in. are on a carryover basis from June into July.

Tinplate — After a strong first half, tinplate demand is expected to decline in the third quarter. Producers report May was not as good a month as hoped. June will probably be better. Some market observers believe tinplate price increases will be delayed until August or later.

Wire Products—Midwest producers believe some June orders will have to be carried over into July. One mill in that area has canceled vacation plans in an effort to reduce carryover tonnages. Wire orders from automotive industry suppliers are coming in at unexpectedly high levels. Spring wire of all types is in especially strong demand.

McLouth Capacity Increase — McLouth Steel Corp., Detroit, has increased its capacity by 15 pct, from a previous 1,574,000 tons to 1,812,000 tons. The change at McLouth has in turn boosted district capacity by 3 pct up to a new total for the area of 7,410,600 tons.

PURCHASING AGENT'S CHECKLIST

U. S. Steel Corp. will make aluminum coated steel sheet. **P. 81**

The post-war steel expansion boom has run out of gas. **P. 82**

Trend to leasing, rather than buying vehicles grows. **P. 84**

COMPARISON OF PRICES

(Effective June 2, 1958)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	June 3 1958	May 26 1958	May 6 1958	June 4 1957
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate	5.12	5.12	5.12	4.37
Plates, wrought iron	13.15	13.15	13.15	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	50.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$10.30	$10.30
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	9.00
Special coated mfg. ternes	9.55	9.55	9.55	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	43.25
Wrought iron bars	14.45	14.45	14.45	11.50
Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢
Rails: (per 100 lb.)				
Heavy rails	$5.525	$5.525	$5.525	$5.275
Light rails	6.50	6.50	6.50	6.25
Semifinished Steel: (per net ton)				
Rerolling billets	$77.50	$77.50	$77.50	$74.00
Slabs, rerolling	77.50	77.50	77.50	74.00
Forging billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00
Wire Rods and Skelp: (per pound)				
Wire Rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225
Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.670¢

	June 2 1958	May 26 1958	May 6 1958	June 4 1957
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.97	$70.97	$70.97	$63.88
Foundry, Valley	66.50	66.50	66.50	65.00
Foundry, Southern Cin'ti	73.87	73.87	73.87	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	65.00
Basic, del'd Philadelphia	70.47	70.47	70.47	68.38
Basic, Valley furnace	66.00	66.00	66.00	64.50
Malleable, Chicago	66.50	66.50	66.50	65.00
Malleable, Valley	66.50	66.50	66.50	65.00
Ferromanganese 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.75
Pig Iron Composite: (per gross ton)				
Pig iron	$66.49	$66.49	$66.49	$64.56
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$37.50	$37.50	$32.50	$50.50
No. 1 steel, Phila. area	34.00	34.00	34.00	55.50
No. 1 steel, Chicago	36.50	34.50	29.50	46.50
No. 1 bundles, Detroit	28.50	26.50	21.50	43.50
Low phos., Youngstown	37.50	37.50	34.00	54.50
No. 1 mach'y cast, Pittsburgh	48.50	48.50	48.50	56.50
No. 1 mach'y cast, Phila.	47.50	47.50	47.50	56.50
No. 1 mach'y cast Chicago	47.50	46.50	42.50	49.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$36.00	$35.33	$32.00	$54.83
No. 2 bundles	26.83	26.17	23.17	43.17
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$15.38
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50-$19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	25.00	25.00	25.00	32.00
Copper, Lake, Conn.	25.00	25.00	25.00	32.00
Tin Straits, N. Y.	94.50†	94.625	94.00	98.375
Zinc, East St. Louis	10.00	10.00	10.00	11.50
Lead, St. Louis	11.30	11.30	11.80	14.80
Aluminum, virgin ingot	26.10	26.10	26.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

INDEX TO PRICE PAGES

Prices At a Glance 171
Comparison of Prices 175
Bars 182
Billets, Blooms and Slabs 180
Boiler Tubes 185
Bolts, Nuts, Rivets, Screws 184
Clad Steel 185
Coke 185
Electrical Sheets 185
Electrodes 185
Electroplating Supplies 184
Ferroalloys 187
Iron Ore 185
Merchant Wire Products 185
Metal Powders 184
Nonferrous
- Mill products 179
- Primary prices 171-177-179
- Remelted metals 179
- Scrap 179

Pig Iron 186
Pipe and Tubing 183
Plates 182
Rails 185
Refractories 185
Shapes 180
Sheets 181
Spring Steel 185
Stainless 186
Steel Scrap 176
Strip 180
Structurals 180
Tinplate 181
Tool Steel 185
Track Supplies 185
Warehouse Prices 184
Water Pipe Index 184
Wire 182
Wire Rod 181

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Is Market Upsurge Near the Peak?

In spite of feelings of new strength here and there, some apprehension is showing.

Standoff between dealers and mills is in evidence again and the peak at present rate of steel operations may be near.

▪ Some uneasy feelings are beginning to show through the market, in spite of continued strength in most areas.

The doubtful sentiments for the most part appeared in the major markets which have shared in the upturn in recent weeks.

The slight pessimism arises from indications that the latest price revival is running out of steam. In some areas, the duel between dealers, refusing to sell at mill prices, and mills fighting the upturn, has reappeared.

Most of the strength this week is based on industrial lists, where strong bidding brought prices several dollars above month-ago levels. The issue now is whether new dealer buying will sustain the feeling generated by list bidding.

Pittsburgh — The latest market surge seems to be running out of steam after a show of strength on the industrial lists. Local factory bundles went for over $40, which was $5 more than last month. However, there were reports that brokers were offering the bundles at reduced figures. At the same time, dealer resistance continues. Yards are unwilling to sell No. 1 heavy melting for less than $39. Prices of a local mill and a mill on the fringe of the district are $1 to $2 under this figure. Depending on who gives ground, prices could move either up or down. But it is clear they are close to the peak for present mill consumption.

Chicago—On scattered mill sales and strong dealer offering prices, the Chicago market again advanced. Overall movement slowed because of the combination of the holiday weekend and broker hesitation in covering orders at prices demanded by dealers. Again, this week, broker buying prices continued to pace, and even outstrip, new mill buying prices.

Philadelphia — The summer doldrums are starting early this year. Very little scrap is moving into dealer yards and less is moving out. Export is becalmed. Optimists are hoping for a September upturn. But even after September many believe it will be a long pull.

New York—Broker competition to fill remaining export orders has raised heavy melting steel prices $1 to a top of $28 for No. 1. Turnings and cast continue unchanged, but better tone to stainless market has boosted 18-8 solids $5 to a top of $145.

Detroit — Prices for scrap on industrial lists rose sharply this month with No. 1 grades up as much as $7 to $8 over last month. Top prices for No. 1 bundles were in excess of $38. Dealer prices rose in sympathy and on the basis of an unconfirmed buy of No. 1 dealer bundles for about $32. Turnings moved up on the basis of apparent market strength. Despite higher prices, some dealers are unconvinced that optimism is well founded.

Cleveland — Bullishness is continuing although no supporting orders are around. Production lists went for $36 to $37 on track and might go out of the district. The market is at a crossroads and can go either way. If no orders materialize a drop similar to February is possible.

St. Louis—The steel operating rate is at 96.8, highest since last October. The market is strong, although unchanged for the most part. The exception is rerolling rails, up $2. Movement has slowed because of the holidays.

Birmingham — Although prices for purchases are unchanged, the trade says the market is strong and predicts an increase when consumers again buy in quantities, which they anticipate early this month. A railroad list closing this week was up $3.50 over the last price for No. 1 heavy melting.

Cincinnati—The market rose $4 on prime grades as area mills entered the market for the month. Greatest demand is for prime grades. Some blast furnace grades are being sold at attractive prices with prime grades. Movement is expected to be healthy, but prices largely unchanged.

Buffalo—Feeling of optimism is growing here. There is a little stronger undercurrent in the market. Dealers sense an upturn in prices soon.

Boston—The market is virtually unchanged. A little pickup in export is expected and the general atmosphere is improved. Some higher prices are expected.

West Coast — There's little optimism for better prices on the Coast. One major mill is buying minimum tonnage only, as it prepares for summer vacation.

SCRAP PRICES *(Effective June 2, 1958)*

Pittsburgh

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	37.00 to 38.00
No. 1 factory bundles	41.00 to 42.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and ms. turn.	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	40.00 to 41.00
Heavy turnings	32.00 to 33.00
No. 1 RR hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	50.00 to 51.00
Rails 2 ft and under	54.00 to 55.00
RR steel wheels	45.00 to 46.00
RR spring steel	45.00 to 46.00
RR couplers and knuckles	45.00 to 46.00
No. 1 machinery cast.	48.00 to 49.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	.... 105.00
430 bundles and solids	95.00 to 100.00
410 turnings	.... 45.00

Chicago

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	37.00 to 38.00
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Low phos. forge crops	46.00 to 47.00
Low phos. punch'gs plate	43.00 to 44.00
Low phos. 3 ft and under	42.00 to 43.00
No. 1 RR hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	48.00 to 49.00
Rerolling rails	55.00 to 56.00
Rails 2 ft and under	52.00 to 53.00
Locomotive tires cut	49.00 to 50.00
Cut bolsters & side frames	46.00 to 47.00
Angles and splice bars	50.00 to 51.00
RR steel car axles	60.00 to 61.00
RR couplers and knuckles	46.00 to 47.00
No. 1 machinery cast.	47.00 to 48.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	38.00 to 39.00
Cast iron brake shoes	38.00 to 39.00
Cast iron wheels	35.00 to 36.00
Malleable	51.00 to 52.00
Stove plate	38.00 to 39.00
Steel car wheels	43.00 to 44.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	90.00 to 95.00
430 bundles and solids	100.00 to 105.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $35.00
No. 2 hvy. melting	29.00 to 31.00
No. 1 dealer bundles	33.00 to 35.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	33.00 to 35.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	15.00 to 16.00
Cast iron borings	16.00 to 17.00
Shoveling turnings	17.00 to 18.00
Clean cast. chem. borings	24.00 to 25.00
Low phos. 5 ft and under	38.00 to 39.00
Low phos. 2 ft and under	39.00 to 40.00
Low phos. punch'gs	39.00 to 40.00
Elec. furnace bundles	34.00 to 35.00
Heavy turnings	28.00 to 29.00
RR steel wheels	42.50 to 43.50
RR spring steel	42.50 to 43.50
Rails 18 in. and under	56.00 to 58.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	43.00 to 44.00
Malleable	58.00 to 59.00
Unstripped motor blocks	30.00 to 31.00
No. 1 machinery cast.	47.00 to 48.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	28.50 to 29.50
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	12.00 to 13.00
Low phos, 18 in. and under	39.00 to 40.00
Rails, random length	43.00 to 44.00
Rails, 18 in. and under	53.00 to 54.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable cast.	32.00 to 33.00
Drop broken cast.	45.00 to 46.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	$32.50 to $33.50
No. 2 hvy. melting	24.50 to 25.50
No. 1 dealer bundles	32.50 to 33.50
No. 1 factory bundles	38.50 to 39.50
No. 2 bundles	21.50 to 22.50
No. 1 busheling	32.50 to 33.50
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Cut structural & plates, 2 ft & under	37.00 to 38.00
Drop forge flashings	32.50 to 33.50
Low phos. punch'gs plate	33.50 to 34.50
Foundry steel, 2 ft & under	33.00 to 34.00
No. 1 RR hvy. melting	35.00 to 36.00
Rails 2 ft and under	53.00 to 54.00
Rails 18 in. and under	54.00 to 55.00
Railroad grate bars	14.00 to 15.00
Steel axle turnings	17.00 to 18.00
Railroad cast.	46.00 to 47.00
No. 1 machinery cast.	46.00 to 47.00
Stove plate	42.00 to 43.00
Malleable	58.00 to 59.00
Stainless	
18-8 bundles	160.00 to 165.00
18-8 turnings	85.00 to 90.00
430 bundles	75.00 to 80.00
430 turnings	30.00 to 35.00

Buffalo

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 busheling	26.00 to 27.00
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	12.00 to 13.00
Low phos. plate	32.00 to 33.00
Structurals and plate, 2 ft and under	35.00 to 36.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	49.00 to 50.00
RR steel wheels	36.00 to 37.00
RR spring steel	32.00 to 33.00
RR couplers and knuckles	32.00 to 33.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	39.00 to 40.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	15.00 to 16.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
No. 1 RR hvy. melting	36.00 to 37.00
Rails, random lengths	42.00 to 43.00
Rails, 18 in. and under	48.00 to 49.00
Angles and splice bars	43.00 to 44.00
Std. steel car axles	51.00 to 52.00
RR specialties	41.00 to 42.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	32.00 to 33.00
Cast iron brake shoes	35.00 to 36.00
Stove plate	38.00 to 39.00
Cast iron car wheels	36.00 to 37.00
Rerolling rails	49.00 to 50.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	34.00 to 35.00
Elec. furnace, 3 ft & under	32.00 to 33.00
Bar crops and plate	37.00 to 38.00
Structural and plate, 2 ft	36.00 to 37.00
No. 1 RR hvy melting	33.00 to 34.00
Scrap rails, random lgth.	43.00 to 44.00
Rails, 18 in. and under	47.00 to 48.00
Angles & splice bars	39.00 to 40.00
Rerolling rails	46.00 to 47.00
No. 1 cupola cast.	48.00 to 49.00
Stove plate	48.00 to 49.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	38.00 to 39.00

Youngstown

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	12.50 to 13.50
Shoveling turnings	17.50 to 18.50
Cast iron borings	17.50 to 18.50
Low phos. plate	37.00 to 38.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	24.00 to 25.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turn.	7.00 to 8.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings	22.00 to 23.00
No. 1 machinery cast.	34.00 to 35.00
Mixed yard cast.	32.00 to 33.00
Charging box cast.	31.00 to 32.00
Heavy breakable cast.	31.00 to 32.00
Unstripped motor blocks	22.00 to 23.00
Stainless	
18-8 prepared solids	140.00 to 145.00
18-8 turnings	45.00 to 50.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	28.00 to 29.00
Drop forge flashings	27.00 to 28.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Low phos. punch'gs plate	30.00 to 31.00
No. 1 cupola cast.	37.00 to 38.00
Heavy breakable cast.	26.00 to 27.00
Mixed cupola cast.	37.00 to 38.00
Automotive cast.	37.00 to 38.00
Stainless	
18-8 bundles and solids	155.00 to 160.00
18-8 turnings	55.00 to 60.00
430 bundles and solids	70.00 to 75.00
410 turnings	20.00 to 25.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 dealer bundles	23.00 to 24.00
No. 2 bundles	14.00 to 15.00
No. 1 busheling	23.00 to 24.00
Machine shop turn.	3.00 to 4.00
Mixed bor. and short turn.	3.00 to 4.00
Shoveling turnings	5.00 to 6.00
Clean cast. chem. borings	14.00 to 15.00
No. 1 machinery cast.	31.00 to 32.00
Mixed cupola cast.	26.00 to 27.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	26.00 to 27.00
Unstripped motor blocks	32.00 to 33.00

San Francisco

No. 1 hvy. melting	.... $32.00
No. 2 hvy. melting	.... 30.00
No. 1 dealer bundles	.... 28.00
No. 2 bundles	.... 22.00
Machine shop turn.	.... 16.00
Cast iron borings	.... 16.00
No. 1 RR hvy. melting	.... 32.00
No. 1 cupola cast.	.... 45.00

Los Angeles

No. 1 hvy. melting	.... $32.00
No. 2 hvy. melting	.... 30.00
No. 1 dealer bundles	$27.00 to 28.00
No. 2 bundles	.... 17.00
Machine shop turn.	9.00 to 11.00
Shoveling turnings	11.00 to 13.00
Cast iron borings	11.00 to 13.00
Elec. furn 1 ft and under (foundry)	.... 43.00
No. 1 RR hvy. melting	.... 33.00
No. 1 cupola cast.	41.00 to 42.00

Seattle

No. 1 hvy. melting	.... $30.00
No. 2 hvy. melting	.... 28.00
No. 2 bundles	.... 22.00
No. 1 cupola cast.	.... 36.00
Mixed yard cast.	.... 36.00

Hamilton, Ont.

No. 1 hvy. melting	.... $30.00
No. 2 hvy. melting	.... 26.00
No. 1 dealer bundles	.... 30.00
No. 2 bundles	.... 23.00
Mixed steel scrap	.... 25.00
Busheling	.... 30.00
Bush., new fact., prep'd	.... 30.00
Bush., new fact., unprep'd	.... 24.00
Machine shop turn.	.... 15.00
Short steel turn.	.... 19.00
Mixed bor. and turn.	.... 15.00
Rails, rerolling	.... 39.00
Cast scrap	$45.00 to 50.00

Copper Price Up; Output Down

While custom smelters increase prices, copper producers cut back their production.

Smelters apparently are testing the market as business has moved up slightly but steadily.

■ For the second time in a week, copper custom smelters upped their price by ¼¢ per lb on the basis of heavy buying. The new price is 24¼¢ per lb.

On the same day as the price hike the previous week, Phelps Dodge cut back its Arizona operations for the fifth time in 18 months.

Last week, also on the same day as the price hike, Anaconda announced it is closing its Leonard Mine in Butte, Mont. This will reduce Anaconda output by about 10 pct.

Straws in the Wind—It may be whistling in the dark, but the trade seems to be paying more attention to the rising custom smelter price than the continued cutting of production by producers.

The reason: Custom smelters traditionally account for less than 20 pct of the domestic market. But they are the first to react to pressure in moving their prices, and so are considered an industry barometer.

Will It Hold?—Normally, a pair of custom smelter price hikes within a week means a firmer market. The trade is hoping this will hold, and the long awaited spring upturn will get underway.

On the other hand, production cuts usually mean demand is still too week for supply. While there has been little talk of the last two slashes, it is definitely tempering optimism.

Slow Upturn—Custom smelters report the latest price hike did not drive many buyers out of the market. Their business has been moving upward slowly but steadily in the last month.

Many observers say it will take another move by custom smelters to make up purchasing agent's minds. If buying holds and smelters up prices again, P.A.'s sitting on the fence will come into the market.

If the price drops, many buyers will start laying back for further reductions.

Washington

Senate hearings on the Administration's subsidy program, originally scheduled for this week, will open Monday, June 9.

The Senate Interior Committee has set four days of hearings on the Administration's program to support the prices of lead, zinc, tungsten, fluorspar and copper. Witnesses will include spokesmen for producers of the five minerals.

Aluminum Hurt? — The aluminum industry, which has complained that government subsidies for copper and zinc would put it at a competitive disadvantage, may also appear.

Interior Dept. spokesmen, including Secretary Fred A. Seaton, also have requested to testify and explain what regulations the Department would adopt to administer the program if it passes. Much of the details of operating the subsidy program would be left to these regulations.

A lot will depend on the shifting tides of congressional opinion in the next month or so.

Tariff Plan—Meanwhile, a plan to earmark 70 pct of the tariff income from lead and zinc imports to aid producers of these two minerals is being pushed in the Senate.

Sen. Gordon Allott, Colorado Republican, is sponsoring an amendment to the Administration's subsidy plan to use this tariff income for higher support payments for lead and zinc producers. Any of these funds not used for higher subsidies would go for loans to mining companies needing financial aid and for mineral research.

Tin prices for the week: May 28—94.500; May 29—94.625; May 30—holiday; June 2—94.50; June 3—94.50.*

* Estimate

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum pig	24.00	23.00	4/1/58
Aluminum ingot	26.10	26.10	4/1/58
Copper (E)	25.00	27.00	1/13/58
Copper (CS)	24.25	24.00	5/27/58
Copper (L)	25.00	27.00	1/13/58
Lead, St. L.	11.30	11.60	5/14/58
Lead, N. Y.	11.50	12.00	5/14/58
Magnesium ingot	30.00	34.00	8/13/56
Magnesium pig	30.25	33.75	8/13/56
Nickel	74.00	84.50	12/6/56
Titanium sponge	180-200	200-230	4/1/58
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 179.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in May based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	25.00
Copper, Lake	25.00
Straits Tin, New York	94.488
Zinc, E. St. Louis	10.00
Lead, St. Louis	11.52
Aluminum ingot	26.10

Note: Quotations are going prices

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1100, 3003	44.6	42.3	41.1	41.7
5052	52.0	46.9	45.2	44.4
6061-0	49.4	45.0	43.2	43.1

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	45.0-46.8	58.4-62.1
12-14	45.7-47.2	59.3-63.8
24-26	49.0-49.5	70.1-74.8
36-38	58.0-58.6	94.2-97.8

Screw Machine Stock—2011-T-3

Size"	¼	⅜-½	¾-1	1¼-1½
Price	61.0	60.5	59.0	56.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ61C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	48.13	.....	45.36	48.32
Brass, 70/30	42.69	43.23	42.63	45.60
Brass, Low	44.90	45.44	44.84	47.71
Brass, R L	45.67	46.21	45.61	48.48
Brass, Naval	47.07	.....	41.38	50.48
Muntz Metal	45.19	.....	41.00	.....
Bomm. Bz.	46.98	47.52	46.92	49.54
Mang. Bz.	50.81	.....	44.91	.....
Phos. Bz. 5%	67.17	.....	67.67	.....

Free Cutting Brass Rod 31.03

TITANIUM

(Freight included in 5000 lbs)

Sheet and strip, commercially pure, $8.50-$10.10; alloy, $15.95; Plate, HR, commercially pure, $6.00-$6.75; alloy, $8.75-$9.50. Wire, rolled and/or drawn, commercially pure, $6.50-$7.00; alloy, $10.00-$11.50; Bar, HR or forged, commercially pure, $5.25-$5.50; alloy, $5.25-$6.35; billets, HR, commercially pure, $4.10-$4.35; alloy, $4.10-$4.20.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.55
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis .. $ 1.31
Cobalt, 97-99% (per lb)....$2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 39.50 to 50.00
Gold, U. S. Treas., per troy oz.....$35.00
Indium, 99.9%, dollars per troy oz..$ 2.25
Iridium, dollars per troy oz....$70 to $80
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$228 to $231
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz...$19 to $21
Platinum, dollars per troy oz...$67 to $70
Rhodium .....$120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 88.625
Thorium, per kg. $43.00
Vanadium .....$ 3.45
Zirconium sponge .....$ 5.00

Remelted Metals

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 25.25
No. 120 ..... 24.25
No. 123 ..... 23.50
80-10-10 ingot
No. 305 ..... 29.25
No. 315 ..... 27.25
88-10-2 ingot
No. 210 ..... 26.25
No. 215 ..... 32.00
No. 245 ..... 28.75
Yellow ingot
No. 405 ..... 21.25
Manganese bronze
No. 421 ..... 23.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.00-24.25
0.60 copper max. 23.75-24.00
Piston alloys (No. 122 type)..23.25-24.25
No. 12 alum. (No. 2 grade)...21.00-21.75
108 alloy 21.50-22.25
195 alloy 24.00-25.50
13 alloy (0.60 copper max.)...23.75-24.00
AXS-679 (1 pct zinc) 21.25-22.25

(Effective June 2, 1958)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 22.00-23.50
Grade 2—92-95% 21.00-21.75
Grade 3—90-92% 20.00-20.75
Grade 4—85-90% 17.00-18.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	21	20¼
Yellow brass	16⅛	14⅛
Red brass	18⅝	17⅞
Comm. bronze	19¼	18½
Mang. bronze	14⅞	14⅛
Yellow brass rod ends	15⅞	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 20½
No. 2 copper wire 19
Light copper 16¾
*Refinery brass 18½
Copper bearing material 17⅝
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 20½
No. 2 copper wire 19
Light copper 16¾
No. 1 composition 18½
No. 1 comp. turnings 18
Hvy. yellow brass solids 13
Brass pipe 15
Radiators 14½
Aluminum
Mixed old cast. ..... 11½—12½
Mixed new clips ..... 14½—15½
Mixed turnings, dry ..... 12½—13½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 18¼—18¾
No. 2 copper wire ..... 16¼—16¾
Light copper ..... 14¼—14¾
Auto radiators (unsweated). 11 —11½
No. 1 composition ..... 14½—15
No. 1 composition turnings.. 13½—14
Cocks and faucets ..... 12 —12½
Clean heavy yellow brass ... 10 —10½
Brass pipe ..... 12 —12½
New soft brass clippings .... 13 —13⅛
No. 1 brass rod turnings .... 10½—11

Aluminum

Alum. pistons and struts .... 5 — 5¼
Aluminum crankcases ..... 9 — 9½
1100 (2S) aluminum clippings 12½—13
Old sheet and utensils ..... 9 — 9½
Borings and turnings ..... 6 — 6½
Industrial castings ..... 9 — 9½
2024 (24S) clippings ..... 10½—11

Zinc

New zinc clippings ..... 4 — 4⅛
Old zinc ..... 3 — 3¼
Zinc routings ..... 1⅞— 2
Old die cast scrap ..... 1½— 1⅝

Nickel and Monel

Pure nickel clippings 42-45
Clean nickel turnings 37-40
Nickel anodes 42-45
Nickel rod ends 42-45
New Monel clippings 28-29
Clean Monel turnings 20-23
Old sheet Monel 25-26
Nickel silver clippings, mixed. 18
Nickel silver turnings, mixed. 15

Lead

Soft scrap lead ..... 6¾— 7
Battery plates (dry) ..... 2¼— 2½
Batteries, acid free ..... 1½— 1¾

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 59 —60
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 9½—10
Solder joints ..... 13¼—13¾
Siphon tops 42
Small foundry type ..... 10½—10¾
Monotype ..... 10½—10¾
Lino. and stereotype ..... 9½— 9¾
Electrotype ..... 8½— 8¾
Hand picked type shells .... 6¼— 6⅝
Lino. and stereo. dross ..... 2¼— 2½
Electro. dross ..... 1¾— 2

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$114.00 *B3*		5.325 *B3*	7.80 *B3*	5.325 *B3*						
	Buffalo, N. Y.	$77.50 *R3, B3*	$96.00 *R3, B3*	$114.00 *R3, B3*	6.225 *B3*	5.325 *B3*	7.80 *B3*	5.325 *B3*	4.925 *R3, B3*	7.15 *S10*	7.325 *B3*			
	Phila., Pa.									7.70 *P15*				
	Harrison, N. J.													15.05 *C11*
	Conshohocken, Pa.		$101.00 *A2*	$121.00 *A2*					4.975 *A2*		7.325 *A2*			
	New Bedford, Mass.									7.60 *R6*				
	Johnstown, Pa.	$77.50 *B3*	$96.00 *B3*	$114.00 *B3*		5.325 *B3*	7.80 *B3*							
	Boston, Mass.									7.70 *T8*				15.40 *T8*
	New Haven, Conn.									7.60 *D1*				
	Baltimore, Md.									7.15 *T8*				
	Phoenixville, Pa.					5.325 *P2*		5.325 *P2*						
	Sparrows Pt., Md.								4.925 *B3*		7.325 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$114.00 *N8*						7.60 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.70 *N7* 7.70 *A5*				15.40 *N7* 15.20 *T8*
MIDDLE WEST	Alton, Ill.								5.125 *L1*					
	Ashland, Ky.								4.925 *A7*					
	Canton-Massillon, Dover, Ohio		$98.50 *R3*	$114.00 *R3, T5*						7.15 *G4*		10.45 *G4*		14.85 *C11*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$77.50 *U1, R3*	$96.00 *U1, R3,W8*	$114.00 *U1, R3,W8*	6.225 *U1*	5.275 *U1, W8,P13*	7.75 *U1,Y1 W8*	5.275 *U1*	4.925 *W8, N4,A1*	7.25 *A1,T8 M8*			8.10 *W8, S9,13*	15.05 *A1, S9,G4*
	Cleveland, Ohio									7.15 *A5,J3*		10.45 *A5*	8.10 *J3*	
	Detroit, Mich.			$114.00 *R5*					5.025 *G3, M2*	7.25 *M2,D1, D2,G3,P11*	7.425 *G3*	10.60 *D2* 10.55 *G3*	8.10 *G3*	
	Anderson, Ind.									7.15 *G4*				
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$77.50 *U1*	$96.00 *U1*	$114.00 *U1, Y1*		5.275 *U1, I3*	7.75 *U1, I3*	5.275 *I3*	4.925 *U1, I3,Y1*	7.15 *Y1*	7.325 *U1, I3,Y1*	10.60 *Y1*	8.10 *U1, Y1*	
	Sterling, Ill.	$77.50 *N4*				5.275 *N4*			5.025 *N4*					
	Indianapolis, Ind.									7.30 *J3*				15.20 *J3*
	Newport, Ky.												8.10 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$96.00 *S1, C10*	$114.00 *C10,S1*					4.925 *R3, S1*	7.15 *R3,T4 S1*	7.325 *R3, S1*	10.50 *S1* 10.45 *R3*	8.10 *S1*	15.05 *S1*
	Owensboro, Ky.	$77.50 *G5*	$96.00 *G5*	$114.00 *G5*										
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	$77.50 *U1, P6*	$96.00 *U1, C11,P6*	$114.00 *U1, C11,B7*	6.225 *U1*	5.275 *U1, J3*	7.75 *U1, J3*	5.275 *U1*	4.925 *P6*	7.15 *J3,B4*			8.10 *S9*	15.05 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.225 *W3*	5.275 *W3*		5.275 *W3*	4.925 *W3*	7.15 *W3,F3*	7.325 *W3*	10.50 *W3*		
	Youngstown, Ohio	$77.50 *R3*	$96.00 *Y1, C10*	$114.00 *Y1*			7.75 *Y1*			7.15 *Y1,J3*	7.325 *U1, Y1*	10.65 *Y1*	8.10 *U1, Y1*	15.05 *J3* 10.65 *Y1*
WEST	Fontana, Cal.	$88.00 *K1*	$105.50 *K1*	$135.00 *K1*		6.075 *K1*	8.55 *K1*	6.225 *K1*	5.675 *K1*	9.00 *K1*				
	Geneva Utah		$96.00 *C7*			5.275 *C7*	7.75 *C7*							
	Kansas City, Mo.					5.375 *S2*	7.85 *S2*						8.35 *S2*	
	Los Angeles, Torrance, Cal.		$105.50 *B2*	$134.00 *B2*		5.975 *C7, B2*	8.45 *B2*		5.675 *C7, B2*	9.05 *J3* 9.20 *C1*			9.30 *B2*	17.25 *J3*
	Minnequa, Colo.					5.575 *C6*			6.025 *C6*	9.10 *K1*				
	Portland, Ore.					6.025 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$105.50 *B2*			5.925 *B2*	8.40 *B2*		5.675 *C7, B2*					
	Seattle, Wash.		$109.50 *B2*			6.025 *B2*	8.50 *B2*		5.925 *B2*					
SOUTH	Atlanta, Ga.					5.475 *A8*			4.925 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$77.50 *T2*	$96.00 *T2*			5.275 *T2, R1,C16*	7.75 *T2*		4.925 *T2, R3,C16*		7.325 *T2*			
	Houston, Lone Star, Texas		$101.00 *S2*	$119.00 *S2*		5.375 *S2*	7.85 *S2*						8.35 *S2*	

(Effective June 2, 1958)

STEEL PRICES

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		SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.												
	Buffalo, N. Y.	4.925 *B3*	6.05 *B3*				7.275 *B3*	8.975 *B3*		6.15 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	4.975 *A2*	6.10 *A2*				7.325 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.15 *B3*			
	Fairless, Pa.	4.975 *U1*	6.10 *U1*				7.325 *U1*	9.025 *U1*			$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	4.925 *B3*	6.05 *B3*	6.60 *B3*			7.275 *B3*	8.975 *B3*	9.725 *B3*	6.25 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.									6.45 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.35 *L1*			
	Ashland, Ky	4.925 *A7*		6.60 *A7*	6.625 *A7*								
	Canton-Massillon, Dover, Ohio			6.60 *R3, R1*									
	Chicago, Joliet, Ill.	4.925 *W8, A1*					7.275 *U1*			6.15 *A5, R3, W8, N4, K2*			
	Sterling, Ill.									6.25 *N4, K2*			
	Cleveland, Ohio	4.925 *R3, J3*	6.05 *R3, J3*		6.625 *R3*		7.275 *R3, J3*	8.975 *R3, J3*		6.15 *A5*			
	Detroit, Mich.	5.025 *G3, M2*	6.15 *G3* 6.05 *M2*				7.375 *G3*	9.075 *G3*					
	Newport, Ky	4.925 *A1*	6.05 *A1*										
	Gary, Ind. Harbor, Indiana	4.925 *U1, I3, Y1*	6.05 *U1, I3, Y1*	6.60 *U1, I3*	6.625 *U1, I3, Y1*	7.00 *U1*	7.275 *U1, Y1, I3*	8.975 *U1, Y1*		6.15 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1, Y1*	7.50 *U1, Y1*
	Granite City, Ill.	5.025 *G2*	6.15 *G2*	6.70 *G2*	6.725 *G2*							$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.70 *C9*						6.25 *C9*			
	Mansfield, Ohio		6.05 *E2*			7.00 *E2*							
	Middletown, Ohio		6.05 *A7*	6.60 *A7*	6.625 *A7*	7.00 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	4.925 *R3, N3, S1*	6.05 *R3*	6.60 *R3*	6.625 *N3, S1*	7.00 *N3, S1, R3*	7.275 *R3*	8.975 *S1, R3*				$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 *U1, J3, P6*	6.05 *U1, J3, P6*	6.60 *U1, J3*	6.625 *U1*		7.275 *U1, J3*	8.975 *U1, J3*	9.725 *U1*	6.15 *A5, J3, P6*	$10.05 *U1, J3*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.925 *P7*	6.05 *P7*							6.15 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.925 *W3, W5*	6.05 *W3, F3, W5*	6.60 *W3, W5*		7.00 *W3, W5*	7.275 *W3*	8.975 *W3*			$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.925 *U1, Y1*	6.05 *Y1*		6.625 *Y1*		7.275 *Y1*	8.975 *Y1*		6.15 *Y1*			
WEST	Fontana Cal.	5.675 *K1*	7.30 *K1*				8.025 *K1*	10.275 *K1*			$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	5.025 *C7*											
	Kansas City, Mo.									6.40 *S2*			
	Los Angeles, Torrance, Cal.									6.95 *B2*			
	Minnequa, Colo.									6.40 *C6*			
	San Francisco, Niles, Pittsburgh, Cal.	5.625 *C7*	7.00 *C7*	7.35 *C7*						6.95 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.												
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	4.925 *T2, R3*	6.05 *T2, R3*	6.60 *T2, R3*	6.625 *T2*					6.15 *T2, R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.									6.40 *S2*			

(Effective June 2, 1958)

STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfrs'. Bright
EAST	Bethlehem, Pa.				6.475 *B3*	8.775 *B3*	7.925 *B3*					
	Buffalo, N. Y.	5.425 *R3,B3*	5.425 *R3,B3*	7.35 *B5*	6.475 *B3,R3*	8.775 *B3,B5*	7.925 *B3*	5.10 *B3*		7.20 *B3*		7.65 *W6*
	Claymont, Del.							5.10 *C4*		7.20 *C4*	7.625 *C4*	
	Coatesville, Pa.							5.10 *L4*		7.20 *L4*	7.625 *L4*	
	Conshohocken, Pa.							5.10 *A2*	6.175 *A2*	7.20 *A2*	7.625 *A2*	
	Harrisburg, Pa.							5.10 *P2*	6.275 *P2*			
	Milton, Pa.	5.575 *M7*	5.575 *M7*									
	Hartford, Conn.			7.80 *R3*		9.075 *R3*	7.925 *B3*					
	Johnstown, Pa.	5.425 *B3*	5.425 *B3*		6.475 *B3*			5.10 *B3*		7.20 *B3*	7.625 *B3*	7.65 *B3*
	Fairless, Pa.	5.575 *U1*	5.575 *U1*		6.625 *U1*							
	Newark, N. J. Camden, N. J.			7.75 *W10* 7.75 *P10*		8.95 *W10* 8.95 *P10*						
	Bridgeport, Conn. Putnam, Conn. Willimantic, Conn.			7.85 *W10* 7.80 *J3*	6.55 *N8*	8.925 *N8*						
	Sparrows Pt., Md.		5.425 *B3*					5.10 *B3*		7.20 *B3*	7.625 *B3*	7.75 *B3*
	Palmer, Worcester, Readville, Mass. Mansfield, Mass.			7.85 *B5,C14*		9.075 *A5,B5*						7.95 *A5, W6*
	Spring City, Pa.			7.75 *K4*		8.95 *K4*						
MIDDLE WEST	Alton, Ill.	5.625 *L1*										7.85 *L1*
	Ashland,Newport,Ky.							5.10 *A7,A1*		7.20 *A1*		
	Canton, Massillon, Ohio	5.90* *R3*		7.30 *R3,R2*	6.475 *R3,T5*	8.775 *R3,R2, T5*						
	Chicago, Joliet, Waukegan, Ill. Harvey, Ill.	5.425 *U1,R3, W8,N4,P13*	5.425 *U1,R3, N4,P13*	7.30 *A5, W10,W8 B5,L2,N9*	6.475 *U1,R3, W8*	8.775 *A5, W10,W8 L2,N8,B5*	7.925 *U1,W8*	5.10 *U1,A1, W8,I3*	6.175 *U1*	7.20 *U1,W8*	7.625 *U1,W8*	7.65 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio Elyria, Ohio	5.425 *R3*	5.425 *R3*	7.30 *A5,C13 C18*		8.775 *A5, C13, C18*	7.925 *R3*	5.20 *R3,J3*	6.175 *J3*		7.625 *R3, J3*	7.65 *A5, C13*
	Detroit, Mich.	5.525 *G3*	5.775 *G3*	7.55 *P3* 7.50 *P8,B5*	6.475 *R5* 6.575 *G3*	8.775 *R5* 8.975 *B5,P3, P8*	8.025 *G3*	5.20 *G3*		7.35 *G3*		
	Duluth, Minn.											7.65 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.425 *U1,I3, Y1*	5.425 *U1,I3, Y1*	7.30 *R3,J3*	6.475 *U1,I3, Y1*	8.775 *R3,M4*	7.925 *U1, Y1*	5.10 *U1,I3, Y1*	6.175 *J3,I3*	7.20 *U1,Y1*	7.625 *U1, Y1,I3*	7.75 *M4*
	Granite City, Ill.							5.20 *G2*				
	Kokomo, Ind		5.525 *C9*									7.75 *C9*
	Sterling, Ill.	5.525 *N4*	5.525 *N4*					5.10 *N4*				7.75 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.30 *C10*	6.475 *C10,S1*	8.775 *C10*	7.925 *S1*	5.10 *R3,S1*		7.20 *S1*	7.625 *R3, S1*	
	Owensboro, Ky.	5.425 *G5*			6.475 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.425 *U1,J3*	5.425 *U1,J3*	7.30 *A5,B4, R3,J3,C11, W10,S9,C8*	6.475 *U1,J3, C11,B7*	8.775 *A5, W10,R3,S9, C11,C8*	7.925 *U1,J3*	5.10 *U1,J3*	6.175 *U1*	7.20 *U1,J3, B7*	7.625 *U1,J3, B7*	7.65 *A5, J3,P6*
	Portsmouth, Ohio											7.65 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.10 *W5*				
	Youngstown, Ohio	5.425 *U1,R3, Y1*	5.425 *U1,R3, Y1*	7.30 *A5,Y1, F2*	6.475 *U1,Y1*	8.775 *Y1,F2*	7.925 *U1,Y1*	5.10 *U1,R3, Y1*		7.20 *Y1*	7.625 *U1, R3,Y1*	7.65 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.175 *J5* 6.125 *K1*	6.175 *J5* 6.125 *K1*		7.525 *K1*		8.625 *K1*	5.90 *K1*		8.00 *K1*	8.425 *K1*	
	Geneva, Utah							5.10 *C7*			7.625 *C7*	
	Kansas City, Mo.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*					7.90 *S2*
	Los Angeles, Torrance, Cal.	6.125 *C7,B2*	6.125 *C7,B2*	8.75 *R3,P14*	7.525 *B2*	10.75 *P14*	8.625 *B2*					8.60 *B2*
	Minnequa, Colo.	5.875 *C6*	5.875 *C6*					5.95 *C6*				7.90 *C6*
	Portland, Ore.	6.175 *O2*	6.175 *O2*									
	San Francisco, Niles, Pittsburg, Cal	6.125 *C7* 6.175 *B2*	6.125 *C7* 6.175 *B2*				8.675 *B2*					8.60 *C7,C6*
	Seattle Wash.	6.175 *B2,N6*	6.175 *B2*				8.675 *B2*	6.00 *B2*		8.10 *B2*	8.525 *B2*	
SOUTH	Atlanta, Ga.	5.625 *A8*	5.425 *A8*									7.65 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.425 *T2,R3, C16*	5.425 *T2,R3, C16*	7.90 *C16*			7.925 *T2*	5.10 *T2,R3*			7.625 *T2*	7.65 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*	5.20 *S2* 5.20 *L3*		7.30 *S2*	7.725 *S2*	7.90 *S2*

• Special Quality (Effective June 2, 1958) † Merchant Quality—Special Quality 35¢ higher.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 J. & L. Steel Co., Stainless Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Yeungstown, O.

PIPE AND TUBING — **Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.**

	BUTTWELD														SEAMLESS							
	⅛ In.		¼ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**
Sparrows Pt. *B3*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Youngstown *R3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fontana *K1*	+8.25	+23.5	+5.25	+19.5	+1.75	+15.00	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00								
Pittsburgh *J3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Alton, Ill. *L1*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Sharon *M3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fairless *N2*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Pittsburgh *N1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Wheeling *W5*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Wheatland *W4*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Youngstown *Y1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Indiana Harbor *Y1*	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.75	+1.00								
Lorain *N2*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Youngstown *R3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Fairless *N2*	7.75	+6.0	11.75	+2.0	14.76	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Fontana *K1*	+3.75		0.25		3.25		3.75		4.25		4.75		5.25									
Pittsburgh *J3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Alton, Ill. *L1*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Sharon *M3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Pittsburgh *N1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Wheeling *W5*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Wheatland *W4*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Youngstown *Y1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Indiana Harbor *Y1*	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50								
Lorain *N2*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50

* Threads only, buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅜, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., o.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 10¢ per lb.

(Effective June 2, 1958)

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over ..... 10.5¢
F.O.B. Riverton or Camden, New Jersey, west of Miss. River .... 9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River ..... 10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River ..... 9.5¢
Canadian sponge iron, del'd in East, carloads ..... 10.5¢
Atomized iron powder, 98% + Fe, 40 mesh,, F.O.B. Easton, Pa., in 100 lb bags .....7.7¢
Atomized iron powder, 98% + Fe, F.O.B. Easton, Pa., in 100 lb. bags. Freight allowed east of Miss. River.....10.5¢
Atomized iron powder, 98% + Fe. Cutting and scarfing grade, F.O.B. Easton, Pa. .....8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe .... 27.5¢
domestic 99.5+% Fe .... 36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe 57.0¢
Electrolytic iron melting stock, 99.84% pure ..... 27.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe..88.0¢ to $2.85
Aluminum, freight allowed.. 38.00¢
Brass, 10 ton lots .....31.1¢ to 47.1¢
Copper, electrolytic ..... 41.50¢
Copper, reduced .....40.3¢ to 48.8¢
Cadmium, 100-199 lb. 95¢ plus metal value
Chromium, electrolytic, 99.85% min. Fe. 03 max. Del'd ... $5.00
Lead, f.o.b. Hammond, Ind. . 19¢
Manganese f.o.b. Extron, Pa. 46.0¢
Molybdenum, 99% .....$3.60 to $3.95
Nickel, chemically precipitated $1.05
Nickel, unannealed $1.00
Nickel, annealed $1.06
Nickel, spherical, unannealed #80 ..... $1.13
Silicon ..... 43.50¢
Solder powder .....13¢ plus met. value
Stainless steel, 302 ..... $1.02
Stainless steel, 316 ..... $1.30
Tin .....14.00¢ plus metal value
Tungsten, 99% (65 mesh) $3.15 (nominal)
Zinc, 5000 lb & over.....17.5¢ to 30.7¢

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
	Pct. Discounts			
½" and smaller x 6" and shorter	49	54	56	57
⅝" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Plow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

	Full case or Keg price
Nuts, Hex, HP reg. & hvy.	
⅜ in. or smaller	60½
⅞ in. to 1 in. inclusive	55½
1⅛ in. to 1½ in. inclusive	58½
1⅝ in. and larger	53½
C. P. Hex, reg. & hvy.	
¾ in. and smaller	60½
⅞ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	46½
Semi-finished Hex Nuts	
⅝ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
(Add 25 pct for broken case or keg quantities)	
Finished	
⅞ in. and smaller	63
Rivets	
	Base per 100 lb
½ in. and larger	$12.25
	Pct. Off List
7/16 in. and smaller	19

Cap Screws

Discount (Packages)

	Full Finished H. C. Heat Treat	C-1018 Steel Full-Finished Cartons Bulk
New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	40	26
⅞", ⅞", and 1" diam. x 6" and shorter	22	3
⅝" diam. and smaller x longer than 6"	8	+13
⅞", ⅞", and 1" diam. x longer than 6" .....+	6	+32
¼" through ⅝" dia. x 6" and shorter	58	49
⅝" through 1" dia. x 6" and shorter	45	33

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Quantity	Discount Mach. Screws	Stove Bolts
Cartons		60	60
Bulk			
To ¼" diam. incl.	25,000-and over	60	..
5/16 to ⅜" diam. incl.	15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In Cartons		16	19
In Bulk			
⅜" diam. & smaller	25,000 and over	14	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Rolled elliptical, 18 in. or longer, 5000 lb lots 40.00
Electrodeposited 31.25
Brass, 80-20, ball anodes, 2000 lb or more 44.00
Zinc, ball anodes, 2000 lb lots 16.00
(for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb 1.0225
(Rolled depolarized add 3¢ per lb)
Cadmium 1.55
Tin, ball anodes $1.13 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 68.70
Copper sulphate, 100 lb bags, per cwt. 22.15
Nickel salts, single, 100 lb bags..... 40.50
Nickel chloride, freight allowed, 300 lb 48.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 24.05
(Philadelphia price 24.50)
Zinc cyanide, 100 lb 60.75
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 10,000 lb or more 31.00

CAST IRON WATER PIPE INDEX

Birmingham 125.8
New York 138.7
Chicago 140.9
San Francisco-L. A. 148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structure	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68	.....	.....	.....	.....
Baltimore	$.10	8.10	9.00	9.78	8.80	8.76	8.60	8.75	10.69*	16.28	15.28	19.83	19.08
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57	.....	.....	.....	.....
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.83	13.00	16.38	15.38	19.93	19.18
Buffalo	.15	8.40	9.15	11.22	8.65	9.05	9.05	8.95	11.15*	16.34	15.15	19.01	18.95
Chicago	.15	8.35	9.60	10.25	8.38	8.71	8.79	8.75	8.95	15.80	14.80	19.35	18.60
Cincinnati	.15	8.49	9.65	10.25	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91
Cleveland	.15	8.33	9.60	10.35	8.48	8.94	9.16	8.84	10.95*	15.89	14.89	19.29	18.69
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65	.....	.....	.....	17.60
Detroit	.15	8.58	9.85	10.60	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86
Houston		7.10	8.05	.....	7.25	8.05	7.25	7.20	11.10	16.20	15.25	19.65	18.95
Kansas City	.20	9.02	10.27	10.82	9.05	9.38	9.46	9.42	9.87	20.02	15.47	20.02	19.27
Los Angeles		9.70**	9.50	11.80	8.00	8.85	8.70	8.75	12.10*	17.05	16.10	21.05	20.35
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12 11*	.....	.....	.....	.....
Milwaukee	.15	8.48	9.73	10.38	8.51	8.84	9.00	8.88	9.18	15.93	14.93	19.48	18.73
New York	.10	8.97	10.23	10.66	9.41	9.53	9.45	9.67	12.86*	16.19	15.19	19.74	18.99
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.10	9.00	10.02	8.79	8.87	8.60	8.75	11.61*	16.11	15.11	19.66	18.91
Pittsburgh	.15	8.33	9.60	10.60	8.48	8.71	8.79	8.75	10.95*	15.80	14.80	19.35	18.60
Portland		10.00[1]	11.75[2]	13.30[3]	11.95[4]	10.10[5]	11.10[6]	9.85[7]	11.34*	18.50	17.45	20.75	20.25
San Francisco	.10	9.45	10.85	11.10	9.55	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35
Seattle		9.95	11.15	12.20	10.00	9.70	9.80	10.10	14.05	17.15	16.35	20.65	20.15
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20	.....	17.35	21.55	21.05
St. Louis	.15	8.69	9.94	10.61	8.74	9.08	9.25	9.12	9.56	16.16	15.16	19.71	18.96
St. Paul	.15	8.94	10.19	10.86	8.99	9.45	9.53	9.37	9.81	.....	15.41	.....	19.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **All sizes except 18 and 16 gage.

†† 10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. [1] 10 ga. x 36" x 120"; [2] 20 ga. x 36" x 120"; [3] 26 ga. x 30" x 96"; [4] ⅛" x 1" in lots of 1000 to 9999; [5] sheared plate ¼" x 84" in lots of 1000 to 9999; [6] 3" x 5.70" in lots of 1000 to 9999; [7] M-1020—1-in. rounds in lots of 1000 to 9999.

(Effective June 2, 1958)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.795	T-1
18	4	1	—	5	2.50	T-4
18	4	2	—	—	1.96	T-2
1.5	4	1.5	8	—	1.155	M-1
6	4	2	6	—	1.545	M-3
6	4	2	5	—	1.30	M-2

High-carbon chromium .. .925 D-3, D-5
Oil hardened manganese .475 O-2
Special carbon ..... .36 W-1
Extra carbon ..... .36 W-1
Regular carbon ..... .305 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

Stainless Type	Cladding	Plate (*A3, J2, L4, C4*) 10 pct	Plate (*A3, J2, L4, C4*) 15 pct	Plate (*A3, J2, L4, C4*) 20 pct	Sheet (*I2*) 20 pct
302		.....	.....	.....	37.50
304		37.95	42.25	46.70	40.00
316		44.40	49.50	54.50	58.75
321		40.05	44.60	49.30	47.25
347		42.40	47.55	52.80	57.00
405		29.85	33.35	36.85	.....
410		29.55	33.10	36.70	.....
430		29.80	33.55	37.25	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 38.75; 1 side, 33.10.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.525	6.50	6.975	.....	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	.....	14.75
So. Chicago *R3*	.....	.....	.....	9.75	.....	.....	.....
Ensley *T2*	5.525	6.50	.....	.....	.....	.....	.....
Fairfield *T2*	.....	6.50	.....	9.75	.....	6.60	.....
Gary *U1*	5.525	.....	.....	.....	.....	6.60	.....
Huntington *C16*	.....	6.50	.....	.....	.....	.....	.....
Ind. Harbor *I1*	5.525	.....	6.975	9.75	.....	6.60	.....
Ind. Harbor *Y1*	.....	.....	.....	9.75	.....	.....	.....
Johnstown *B3*	.....	6.50	.....	.....	.....	.....	.....
Joliet *U1*	.....	.....	6.975	.....	.....	.....	.....
Kansas City *S2*	.....	.....	.....	9.75	.....	.....	14.75
Lackawanna *B3*	5.525	6.50	6.975	.....	.....	6.60	.....
Lebanon *B3*	.....	.....	6.975	.....	14.50	.....	14.75
Minnequa *C6*	5.525	7.00	6.975	9.75	.....	6.60	14.75
Pittsburgh *P5*	.....	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	9.75	.....	.....	.....
Seattle *B2*	.....	.....	.....	10.25	.....	6.75	15.75
Steelton *B3*	5.525	.....	6.975	.....	.....	6.60	.....
Struthers *Y1*	.....	.....	.....	9.75	.....	.....	.....
Torrance *C7*	.....	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.50	.....	.....	.....	.....	.....
Youngstown *R5*	.....	.....	.....	9.75	.....	.....	.....

COKE

Furnace, beehive (f.o.b.) Net-Ton
Connellsville, Pa. ..... $15.00 to $15.75
Foundry, beehive (f.o.b.) $17.50 to $19.00
Foundry oven coke
Buffalo, del'd $31.75
Detroit, f.o.b. 30.50
New England, del'd 31.55
Kearney, N. J., f.o.b. 29.75
Philadelphia, f.o.b. 29.50
Swedeland, Pa., f.o.b. 29.50
Painesville, Ohio, f.o.b. 30.50
Erie, Pa., f.o.b. 30.50
Cleveland, del'd 32.65
Cincinnati, del'd 31.84
St. Paul, f.o.b. 29.75
St. Louis, f.o.b. 31.50
Birmingham, f.o.b. 28.85
Milwaukee, f.o.b. 30.50
Neville, Is., Pa. 29.25

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1958 season. Freight changes for seller's account.

Gross Ton
Openhearth lump $12.70
Old range, bessemer 11.85
Old range, nonbessemer 11.70
Mesabi, bessemer 11.60
Mesabi, nonbessemer 11.45
High phosphorus 11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.625	
Armature	11.10	10.85	11.35
Elect.	11.80	11.55	12.05
Special Motor	.....	12.10	
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
Trans. 65	15.55	Grain Oriented	
Trans. 58	16.05	Trans. 66	20.20
Trans. 52	17.10	Trans. 80	19.20
		Trans. 73	19.70

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*N5*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	26.00	40	100, 110	10.70
20	72	25.25	35	110	10.70
18	72	25.75	30	110	10.85
14	72	25.75	24	72 to 84	11.25
12	72	26.25	20	90	11.00
10	60	28.00	17	72	11.40
10	48	28.50	14	72	11.85
7	60	28.25	12	60	12.95
6	60	31.50	10	60	13.00
4	40	35.00	8	60	13.30
3	40	37.00			
2½	30	39.25			
2	24	60.75			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00) $135.00
No. 1 Ohio 120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill. 120.00
No. 2 Ohio 103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00) 21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $150.00
Childs, Hays, Pa. 155.00
Chicago District 160.00
Western Utah 175.00
California 180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 157.00-160.00
Silica cement, net ton, bulk, Latrobe 28.50
Silica cement, net ton, bulk, Chicago 25.50
Silica cement, net ton, bulk, Ensley, Ala. 26.50
Silica cement, net ton, bulk, Mt. Union 24.50
Silica cement, net ton, bulk, Utah and Calif. 37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt. $105.00
Standard chemically bonded, Curtiner, Calif. 115.00
Burned, Balt. 99.00

Magnesite Brick

Standard Baltimore $131.00
Chemically bonded, Baltimore 116.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk. $73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 46.00
in sacks 52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.75
Midwest 17.00
Missouri Valley 15.00

(Effective June 2, 1958)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187		212	193	8.65	9.20
Aliquippa *J3***	173	190			190	8.65	9.325
Atlanta *A8***	175	192		214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	8.75	9.425**
Buffalo *W6*	.....	.....	.....	.....	.....	8.65	8.95*
Chicago *N4****	173	190	172	212	196	8.65	9.325
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	8.65	.....
Crawf'dav. *M4***	175	192		214	198	8.75	9.425
Donora, Pa. *A5*	173	187		212	193	8.65	9.20
Duluth *A5*	173	187		212	193	8.65	9.20
Fairfield, Ala. *T2*	173	187		212	193	8.65	9.20
Galveston *D4*	9.10‡	.....		.....	.....	.....	.....
Houston *S2*	178	192		217	198	8.90	9.45
Jacksonville *M4*	184-1	197		219	203	9.00	9.675
Johnstown *B3***	173	190	172		196**	8.65	9.325**
Joliet, Ill. *A5*	173	187		212	193	8.65	9.20
Kokomo *C9**	175	189		214	195*	8.75	9.30*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.60	10.275
Kansas City *S2**	178	192		217	198*	8.90	9.45*
Minnequa *C6*†	178	192	177	217	188†	8.90	9.45†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.20
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	8.95	9.50*
Pittsburg, Cal. *C7*	192	210			213	9.60	10.15
Rankin, Pa. *A5*	173	187			193	8.65	9.20
So. Chicago *R3*	173	187			193	8.65	9.20
S. San Fran. *C6*‡	.....	.....		236	.....	9.60	10.15†
SparrowsPt. *B3***	175	.....		214	198	8.75	9.425
Sterling, Ill. *N4****	175	192	172	214	198	8.75	9.425
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.30
Worcester *A5*	179	.....	.....	.....	.....	8.95	9.50
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢.
** 11-12¢ zinc.
*** .10¢ zinc.
† Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *J3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *J3*	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
National Tube	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
Pittsburgh Steel	2	13	36.34	42.56	.....
	2½	12	48.94	57.31	.....
	3	12	56.51	66.18	.....
	3½	11	65.97	77.25	.....
	4	10	87.61	102.59	.....

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	66.00	66.50	66.50	67 00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68 00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66 50	67.00	67.50	.....
Sharpsville *S1*	66.00	.....	66.50	67.00	.....
So. Chicago *W8*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	74.00
Youngstown *Y1*	.....	.....	66.50	67.00	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	37.25	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50.00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.00	80.75	65.50	79.25	48.25	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.00	80.75	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50 52.75	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A5;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2.* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R5;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9,* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A5,* Bridgeville, Pa., *U2,* Detroit, *M2;* Canton, Massillon, O., *R5;* Harrison, N. J., *D3;* Youngstown, *J3;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1,* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A5;* Massillon, O., *R5,* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A5;* Waukegan, *A5;* Canton, O., *T5, R5;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owenboro, Ky., *G5;* Bridgeport, Conn., *N8.*

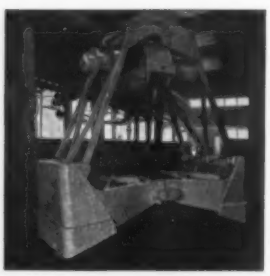
Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A5;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A5;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A5;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown; *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R5;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R5;* Watervliet, *A5;* Pittsburgh, Chicago, *U1* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

(Effective June 2, 1958)



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LOAD CAPACITY
DIGGING POWER

Foundries, steel mills, power plants — all acclaim this Hayward Electric Clam-Shell as the finest hook-on bucket obtainable. Handles extra large loads safely. Notable for giving many years' service with minimum maintenance. Interchangeable with your electric magnet. The Hayward Company, 50 Church St., New York 7, N. Y.

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CARBON • ALLOY • STAINLESS

"C" Steel Castings possess many qualities other than the strength of steel. They provide for more freedom and efficiency of design, better weight-strength ratio and greater fatigue resistance, i.e., longer life and less replacement. "C" Steel Castings

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are foundry engineered from pattern to finished casting. They require minimum machining and assembly costs. Perhaps you can utilize the advantages of "C" Steel Castings in your products to reduce costs and gain additional quality and buyers' appeal. Our engineering staff is at your service. Write, phone or call.

CRUCIBLE STEEL CASTING CO.

LANSDOWNE 1, PENNA.

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.50
0.025% C (Simplex) 36.75
0.10% C, 52-57% Cr, 2.00% max Si. 37.50
7-8½% max C, 50-55% Cr, 3-6% max Si 22.50
7-8½% max C, 50-55% Cr, 3% max Si 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C $1.31
0.50% max. C 1.31
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.40

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.29
Ton lots 1.31
Less ton lots 1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	27.50	14.20
Ton lots	32.75	15.65
Less ton lots	34.35	17.30

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads 25.65
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads 24.25
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 14.80
Ton lots packed in bags 17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads 34.00
Ton lots 36.00
250 to 1999 lb 38.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	(Bulk) 37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk 12.80
Ton lots, packed 14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet 15.10
Packed, pallets, 3000 lb up to carloads 16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe..	24.20	22.90
98% Si, 0.75% Fe	24.95	23.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 7.70
Ton lots, packed 10.50

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.20	75% Si....	16.40
65% Si....	15.25	85% Si....	18.10
	90% Si....	19.50	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth 3.20
Crucible 3.30
High speed steel (Primos) 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective June 2, 1958)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk ..... 10.35¢
Ton lots ..... 11.70¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D, delivered per pound contained Cb.

Ton lots $4.00
Less ton lots..... 4.05

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Sb plus Ta $3.80

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 ..... $1.38

Zirconium, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed ..... 27.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.. $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight allowed, 100 lb and over

No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

ELECTRICAL POWER EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New Elliott	Enc. F.V.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
1	2250	New Elliott	Enc. F.V.	600	298/360
1	2200	G.E.	MCF	600	400/500
1	1750	New Elliott	Enc. F.V.	250	175/350
4	1500	New Whse.	Enc. F.V.	525	600
1	1375	G.E.	MCF	415	1300
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
1	940	Whse.	QM	250	140/170
2	800	G.E.	MCF	250	400/750
3	750	G.E.	MCF	600	450/900
1	750	G.E.	MCF	600	300/720
1	750	G.E.	MCF	600	120/360
4	600	Whse.		250	275/550
1	500	G.E. B.B.	TLF-2856H	250	2000/3600
1	500	G.E.	MPC-10	250	188/400
3	450	Whse.		550	415
2	400	G.E.	CY-275	300	1000/1500
1	300	Cr.Wh.	H-102 B.B.	230	1200
2	300	G.E.	MPC	230	400
2	275	G.E. B.B.	TLC-108	250	2000/4000
1	225	G.E. B.B.		250	1150/3600
1	200	Rel. B.B.	T-564-D.P.	240	1750
1	200	Rel. B.B.	T-663-D.P.	240	1150
1	200	Rel. B.B.	T-664-D.P.	240	850
1	200	Whse.	CB-207.4	250	850/1200
1	150	Cr.Wh.	CMC-65H	230	1150
1	150	G.E. B.B.	TLC-74	250	1150/3500
1	150	Rel. B.B.	T-663-D.P.	240	850
1	150	G.E. B.B.	CD	600	250/750
1	120	G.E. B.B.	TLC-50	250	1950/5000
1	125/150	New Whse.	CB-210.3	230	300/1200
1	120	Rel. B.B.	1060T	230	575/900
1	125	Whse.	SK-190	230	450/1200
2	125	Whse.	SK-185	230	350/1050
1	100	G.E.	CDP-115	230	1750
2	100	Whse.	SK-181	230	450/1000
1	75	Rel. B.B.	T-663 D.P.	240	520
1	75/100	Rel. B.B.	T-664-D.P.	240	400/1600
1	75	G.E. B.B.	CD-1235-D.P.	600	850
1	60/75	Rel. B.B.	T-664-D.P.	240	300/1200
1	60/80	Rel. B.B.	T-563-D.P.	240	650/1950
2	60	Rel. B.B.	T-406-D.P.	240	1750/2400
1	50	Rel. B.B.	T-405-D.P.	240	1750
1	40	Rel. B.B.	T-405-D.P.	240	1750
6	40	Rel. B.B.	385F. TEFC	230	500/1500
1	30/40	Rel. B.B.	T-564-D.P.	240	300/900

MERCURY ARC RECTIFIERS

3—150 KW, G.E., Sealed Tube Ignitron Unit Substation load centers 275 V. D.C., 2300 V. A.C. Pyranol filled transformers complete.
2—150 KW, G.E., Ignitron, 245 V. D.C.—220 V. A.C., air cooled transformers with controls.

MG SETS—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	G.E.	600	600	2300/4150
2	1000	G.E.	720	600	6600/13200
2	750	G.E.	720	250/300	6600/13200
1	500	Whse.	900	125/250	440
1	500	G.E.	900	125/250	440
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	200	G.E.	1200	250	440/550
1	200	Whse.	1200	550	2200
1	200	El.Mby.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	125	440
1	140	Cr.Wh.	880	125/250	2300
1	100	G.E.	1170	250	220/440
1	100	Cr.Wh.	1800	240	440
2	100	Cr.Wh.	1140	525	220/550
1	100	G.E. (unused)	1200	250	2100/4100
2	75	Whse.	1200	125	440
1	125	G.E.	1800	250	220/440
1	240	Whse.	900	125	220/440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
1	1500	G.E. auto	HT	3	4000/4200/4400
3	1000	G.E.	OA/FA	1	13800 x 230/460
2	750	G.E.	Pyranol	1	4800x85/55-255/165
3	500	Kuhl	OISC	1	13200 x 6600
3	333	G.E.	OISC	1	13200 x 2530/4380Y
3	150	G.E.	OISC	1	33000x2300/4000Y
3	100	Whse.	SK	1	4600x460/230/115
3	333	G.E.	OISC	3	2400/4160Y x 600

CRANE & MILL MOTORS

230 V., D.C.

Qu.	H.P.	Make	RPM	Type
14	12/15	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5, Series
2	23	G.E.	650	MDS-408-AE-2 sh.
2	25	G.E.	725	CO-1808, Series
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Comp. S.B.
3	50	G.E.	650	COM-1830 Comp.
3	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	550	MD-412AE 2 Comp. R.B.
1	50	Cr.Wh.	550	SW-50 Comp.
1	100	G.E.	475	CO-1832 Series S.B.
6	100/140	Whse.	500/415	MC-90 Series R.B.

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THE CLEARING HOUSE

Summer Sales Pickup Expected in West

Used machinery dealers there say inquiries are plentiful, but customers are hunting for bargains.

San Francisco sellers blame government surplus disposal for drop in their volume.

■ West Coast used machinery dealers look for a summertime sales increase. There are signs of a business pickup in Los Angeles, San Francisco and Seattle.

Inquiries are plentiful, but they're coming mostly from bargain hunters. Any machine in good condition and not older than seven or eight years can find a buyer—if the price is right.

Why They Hope — Behind the hopefulness in the Los Angeles area is a step up in air-conditioning business, and a looked-for increase in commercial, industrial, and apartment building construction.

Sheet metal equipment continues the hottest thing on the market. Most wanted are light shears and small press brakes up to 10 gage. They bring good prices because the supply hardly meets the demand.

Heavier equipment, however, moves slowly. Steel fabricators are busy. But lacking healthy backlogs, they're not willing to spend unless it is for a piece of very badly needed equipment.

Buyers Choosy—There are plenty of customers around the San Francisco Bay Area for merchandise at the right price. The eager lookers are from both large and small machine shops, mostly in the electronic industry.

But used machinery buyers are critical and want only good quality equipment. Favorites now: engine lathes, milling machines, radial drills, press brakes.

Some dealers, however, say volume is off about 25 pct. They blame government surplus selling. These dealers looked for the large plants recently established in the Bay Area to become heavy buyers. Instead, the plants are equipping their facilities from the government machinery pool. And other large buyers who are opening Far-western plants are shipping tools there from shops elsewhere.

Supplies from East — Foreign tools, while not selling as they were, still are doing well. The lower prices on good used domestic machinery no longer leaves foreign equipment with the price advantage it once had.

Prices on used machinery are down enough in the East to offset shipping costs to the Coast. So some San Francisco Bay Area dealers are buying larger equipment and shipping it West. One dealer says he's making such purchases for speculation, buying "four surface grinders bigger than anything available on the West Coast."

More Life in North—With an upsurge in industrial activity in the Seattle and Pacific Northwest area —particularly recent Boeing Airplane Co. orders—the used machinery market there is swinging out of a winter-long doldrum.

Demand is moving ahead again for high-quality "priced right" heavy tools. Most wanted: large lathes and shears.

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ANGLE BENDING ROLL
3 x 3 x ⅝ Buffalo No. 1 Angle Bending Roll
BALER
Model #122-PX-60 Logemann, Baling Chamber 60 x 14 x 18"
BENDER & STRAIGHTENER
Pels Type JH All Steel Bender & Straightener for Beams, Chanels, Angles, Tees—Angles Equal & Tees 8 x 8 x 1⅛"
BENDING ROLLS
8' x ¼" Bertsch Initial Type
12' x 5/16" Bertsch Initial Type
16' x ⅜" Ransome Pyramid Type
20' x ¼" Niles Pyramid Type
BRAKES—PRESS TYPE
500 ton Pacific Hydraulic, 10' Bet. Housings
10' x ¼" & 12' x ¼" Hydraulic—NEW
CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton	J&H	56' Span 220/3/60
5 ton	Shepard Niles	70' Span 230 Volt D.C.
7½ ton	Shaw	40' Span 230 Volt D.C.
8 ton	P&H	55' Span 220/3/60
10 ton	P&H	39' Span 230 Volt D.C.
10 ton	Shaw	48' Span 230 Volt D.C.
10 ton	P&H	52' Span 250 Volt D.C.
10 ton	Shaw	120' Span 230 Volt D.C.
15 ton	Northern	54' Span 230 Volt D.C.
15 ton	Shepard Niles	56' Span 230 Volt D.C.
20 ton	Shepard Niles	98' Span 250 Volt D.C.
20 ton	P&H	100' Span 250 Volt D.C.
120 ton	Shepard Niles	77' Span 220/3/60

DRAW BENCH
10,000# Aetna Stand Single Draw 44 Ft. Length of Draw
FLANGING MACHINE
¾" McCabe Pneumatic Flanging Machine

FORGING MACHINES
1" to 2" Acme, Ajax, National
FURNACE—MELTING
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LEVELERS—ROLLER
37" Torrington, 19 Rolls 1 31/32" dia.
44" Newbold, 9 Rolls 4" dia.
60" Aetna Standard, 17 Rolls 4¾" dia.
MILLING MACHINE—PLANER TYPE
42" x 42" x 14' Ingersoll 2 Rail & 2 Side Heads
PRESSES—HYDRAULIC
600 ton HPM Fastraverse, Bed 36" x 36"
600 ton Elmes 36" Stroke, 48 x 45" Bet. Cols.
1000 ton HPM Fastraverse, Bed 48" x 74", 36" Stroke
1500 ton Mesta Steam Hydr. Forging Press
PRESSES—STRAIGHT SIDE
180 ton Hamilton #847, 12" Str. 35½" Bet. Ups.
200 ton Clearing F1200-42, Stroke 20", Bed 44" x 38"
250 ton Bliss 81 7½ Str. Bistr. 33" x 39"
PUNCH & SHEAR COMBINATIONS
Buffalo #1½ Ironworker
Cleveland Style C; Arch Jaw, Capy. ⅝" x ⅝"
Cleveland Style EF, Arch Jaw, Capy. 1¼" x 1"
ROLLING MILLS
6" x 1" Three Stand Wire. Rolling Mill Complete with Pay Off & Recoiler
6" x 5" Torrington Flat Wire Mill Line
8" x 10" Single Stand Two High
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
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16" x 24" Single Stand Two High
20" x 36" Single Stand Two High

ROLL—FORMING
18 Stand Custom Built, 2½ Shaft, will take 36" wide
ROLLS—PLATE STRAIGHTENERS
108" Bertsch, Seven Rolls 9" Dia.
72" Niles 7 Rolls 9" Dia. Motor Driven
SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"
SHEAR—ANGLE
6 x 6 x ⅝" Hilles & Jones
SHEAR—GATE
10' x ½" Bertsch
10' x 1" Hilles & Jones
SHEAR LINE
36" x .020 Ga. Hallden Shear Line
SHEAR—ROTARY
#750 Kling, 48" Throat, ¾" Capacity—LATE
SHEARS—SQUARING
6' x 14 Ga. Edwards, Motor Drive—LATE
10' x ¼" Cincinnati
14 x 3/16" Cincinnati #1814
SLITTERS
36" Wean Slitting Line
48" Wean Slitting Line
STRAIGHTENERS
¾" Lewis 4C with 22 Ft. Cut Off
Shuster Shape Straightener, Capy. 1" Hex. Sq. Rd
Torrington 12-Roll Capy. 1¾" Sq. Etc.
No. 0 Medart 2 Roll, Capacity ¾"-1⅛" Bars
No. 3 Medart 3 Roll, Capacity to 4½" Tubing
SWAGING MACHINES
#6½A Fenn Capacity 3¾" Tube 1¼" Solid
10" Die Length Hydraulic Feed, LATE
TUBE REDUCER
2½" Tube Reducing Co. Tube Reducer
WIRE DRAWING MACHINES
Type B Morgan 4-Block, Capy. #5 Rod down

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G.E. 6-section cubicle, 156" long x 68" high x 68" deep (5) sections have type FKR-225 breakers, 15-KV, 600 amps., 150,000-KV I.C., 125-VDC closing, 220-VAC tripping with CT's, meters, CO relays, (1) section with PT, fuses, drawout disconnect switch.

Westinghouse Net Work unit with network protector, 500-KVA, 3 phase, 60 cycle transformer, 13,200/11,880-120/208-Volts with throat connected primary disconnect switch both inerteen filled with throat connected protector cubicle having following 3-pole air circuit breakers, all with (3) overloads —(1) 1600 amps. motor operated drawout breaker, (2) 800 amps. manual operated breakers, (8) 225 amps. manual breakers.

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MOTORS AND GENERATORS

1500 HP D.C. MOTORS

1500 HP—525 volts D. C.—600 R.P.M.—NEW—2-bearing continuous duty motors —manufactured by Westinghouse. In original crates. From Navy Destroyer Escort. SPECIFICATIONS: 2-bearing 1500 HP—525 volts DC—2270 amps—600 RPM—ambient temperature 40 C—class B insulation—2-bearing pedestal sleeve type—shunt wound—efficiency 94.23%. ONLY 6 AVAILABLE—BUY NOW AND SAVE. Suitable for steel mill drive—offshore oil rigs—rolling mill drive—dredge pump applications.

1200 KW GENERATORS

(2) Equal to new—manufactured by Allis-Chalmers. 1200 KW—525 volts D.C.—2290 amps—750 RPM—cooling self-ventilated —totally enclosed—separate excitation—continuous duty—class B insulation—mfg. type M.H.C.—frog leg armature.

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SPECIAL
STANDARD GAUGE CARS
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6,000- 8,000- and 10,000-Gallon
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3870 C.F.M.—Ing. Rand PRE 2—700 HP
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445 C.F.M.—Chgo. Pneum PM 4—75 HP
DIESEL LOCOMOTIVES
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1—Plymouth 30 ton 36 in. ga.
2—25 ton & 1— 80 ton GE. 42" ga.
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No. 2K Kearney & Trecker, m.d.
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No. 4 Cincinnati H.S., Dial Type, m.d.
No. 4K Kearney & Trecker, m.d.
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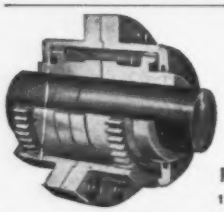

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A

AAA Machinery & Equipment Co. 191
Acme-Newport Steel Co. 133
Ajax Electric Co. 87
Ajax Electrothermic Corp. 87
Ajax Engineering Corp. 87
*Alco Products Inc. ..... 30 & 31
Allegheny Ludlum Steel Corp. .. 58
Allis-Chalmers Mfg. Co. 74
American Air Compressor Corp. 191
American Optical Co. 50
*American Pulverizer Co. 169
*American Smelting & Refining Co., Continuous Cast Products Dept. 23
*Armco Steel Corp. 6
*Armstrong Bros. Tool Co. 175
Associated Spring Corp. 48

B

Babcock & Wilcox Co., The Refractories Division 105
Baldt Anchor, Chain & Forge Div. 193
Barber-Colman Company ..... 70 & 71
*Barnes Wallace Steel Division Associated Spring Corp. 48
*Bay State Abrasive Products Co. 19, 20, 21 & 22
Bearings, Inc. 90
Beatty Machine & Mfg. Co. 165
Belyea Co., Inc. 188
Bertsch & Company 162
*Bethlehem Steel Co. 1
Blaw-Knox Co., Foundry & Mill Machinery Division 139
Bliss, E. W., Co. ..... Back Cover
Boston Metals Company 189
Boynton, A. J., & Co. 194
Brownell, Hazard, Machine Tools, Inc. 190
Bucyrus-Erie Co. 152
*Byers, A. M., Company 69

C

*Cambridge Wire Cloth Co., The 151
*Carborundum Co., Refractories Div. 43
Carco Industries, Inc. 193
Cattie, Joseph P., & Bros. 194
Cleveland Crane & Engineering Co., The Steelweld Machinery Div. 143
Colorado Fuel & Iron Corp., The Wickwire Spencer Steel Div. 52 & 53
Commercial Die Co. 193
Consumers Steel & Supply Company 192
Continental Screw Co. 8
Cook County Machinery Co. 190
*Copperweld Steel Co. Aristoloy Steel Division Inside Front Cover
*Cowles Tool Co. 135
Cox & Sons Co., The 191
Crucible Steel Casting Co. 186

D

Davidson Pipe Co., Inc. 191
*DeLaval Steam Turbine Company 49
Detroit Steel Corp. 109
*Dixon, Joseph, Crucible Co., Pencil Sales Division 11
Dravo Corporation 111
*Dreis & Krump Mfg. Co. 13
Duraloy Co., The 150
*Dyson, Joseph, & Sons, Inc. ... 147

E

Eastern Machinery Co., The 190
Easton Car & Construction Co. .. 135
*Electric Furnace Co., The 149
Electric Steel Foundry Company 66
Electro Metallurgical Co., Div. of Union Carbide Corp. 37
Espen-Lucas Machine Works, The 65

F

*Formed Steel Tube Institute 95
Foundry & Mill Machinery Division Blaw-Knox Company 27
Frank, M. K. 190
*Fuller Company 42

G

Gallard-Henning Mfg. Co. 154
Garson, Jack 191
Goodman Electric Machine Co. 189
Goss & DeLeeuw Machine Co. .. 194
*Great Lakes Steel Corp. ....44 & 45
Greist Manufacturing Co., The Greider Industries, Inc. 193

H

*Hansen Manufacturing Co. 110
Harbison-Walker Refractories Co. 10
Hardinge Mfg. Co. 192
Hayward Company, The 186
Henry, A. T., & Company, Inc. . 189
Heppenstall Company 51
Hevi-Duty Electric Company ... 155
*Hooker Electrochemical Co. 68
Hudson Iron & Metal Co. 191
Huebel Mfg. Co., Inc. 193
Hughes, Arnold Co. 191-192
Hyde Park Foundry & Machine Co. 148
Hyman, Joseph, & Sons 190

I

*Inland Steel Co. 89
International Nickel Co., Inc., The 140
*International Research & Development Corp. 16
Iron & Steel Products, Inc. 189

J

Jones & Laughlin Steel Corporation ..... 144 & 145
*Jones & Laughlin Steel Corporation, Stainless Steel Division ... 161

K

Keystone Forging Co. 193
*Keystone Steel & Wire Co. 163
King Foundries, Inc. 192
Kingsbury Machine Tool Corp. .. 59

L

*Landis Machine Co. 25
Lang Machinery Co. 191
Lima Works, Construction Equipment Division, Baldwin-Lima-Hamilton Corporation 63
Link-Belt Co. 62
Logan Co. 156

IN THIS ISSUE

M

MacCabe, T. B., Co. 189
Mahon, R. C., Co., The 193
*Manning, Maxwell & Moore, Inc. .....114 & 115
*Marchant, Geo. F., Co. 158
Marshall Railway Equip. Corp. .. 190
Master Electric Co., The Inside Back Cover
*Metallurgical Products Department of General Electric Company .....26 & 27
Miles Machinery Co. 190
Miller Electric Mfg. Co., Inc. 167
Monarch Machine Tool Co. 32 & 33
Morrison Railway Supply Co. 190
*Mundt, Chas., & Sons 194

N

National Acme Co., The .....14 & 15
National Business Bourse, Inc. .. 192
National Machinery Co. 18
National Machinery Exchange .. 190
National-Standard Co. 136
National Steel Corp. ..... 44 & 45
New England Pressed Steel Co. .. 193
New Jersey Zinc Co., The 96
Noble Company 56
Northern Engineering Works 24

O

Ohio Steel Foundry Co. 106
*Oliver Corp., The, A. B. Farquhar Division 112
*Olsen, Tinius, Testing Machine Co. 159
Olson Manufacturing Co. 192
Ornitz Equipment Corp. 190
Osborn Mfg. Co., The, Brush Division 5

P

Peterson Steels Inc. 153
Pittsburgh Engineering & Machine, Division of Pittsburgh Steel Foundry Corporation 4
*Poole Foundry & Machine Co. . 194
Power Press Specialists 190
Purdy Company, The 191

Q

Quaker State Metals Company .. 12

R

Rail & Industrial Equip. Co., Inc. 189
*Republic Steel Corp. .....34 & 35
*Robbins & Myers, Inc., Crane & Hoist Div. 40
Rockwell Engineering Co. 191
Roebling's, John A., Sons Corp. 41
*Rolled Alloys, Inc. 113
Rosedale Foundry & Machine Co. 193
Ryerson, Jos. T., & Son, Inc. 170

S

SKF Industries, Inc. 146
Saling Manufacturing Company.. 193
*Sandvik Steel, Inc. 55
Schwartz, Herman H. 191
*Sheffield Corporation, The, of Bendix Aviation 38
*Shepard Niles Crane & Hoist Corp. 168
Signode Steel Strapping Co. 46
Simonds Saw & Steel Co. 73
Smith, Thomas, Co. 193
*Somers Brass Co., Inc. 9
Southworth Machine Co. 100
Spectrochemical Laboratories, Inc. 108
*Spencer Turbine Company, The .. 166
*Stamco, Inc. 116
Stanhope, R. C., Inc. 189
*State of Florida Development Commission .....28 & 29
Steel & Tube Div., Timken Roller Bearing Co. 76
*Steelweld Div., The Cleveland Crane & Engineering Co. 143
Sun Oil Co. 102
Superior Steel, Division of Copperweld Steel Co. 17
*Superior Tube Co. 72
Surface Combustion Corp., Heat Treat Division 54

T

Texas Company, The 98
Timken Roller Bearing Co., The Steel & Tube Division 76
Torrington Co., The 173
*Townsend Company, The 137
Tractor & Equipment Co. 190

U

Union Carbide Corp., Electro Metallurgical Division 37
United Air Lines 36
United Engineering & Foundry Co. 39
U. S. Steel Wire Spring Co., The 195

V

*Victor Equipment Co. 57

W

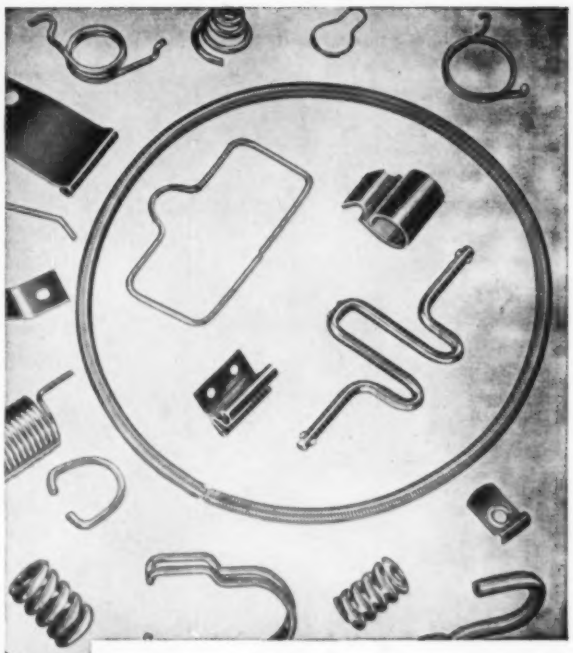
*Waldron, John, Corp. 134
Wallack Bros. 192
Ward Steel Co. 148
Waterbury-Farrel Foundry & Machine Co. 138
Weatherly Foundry & Mfg. Co... 192
Weiss, B. M., Co. 190
Weiss Steel Co., Inc. 192
Welding Fittings Corp. 191
Wheelabrator Corporation ..60 & 61
*Wheelock, Lovejoy & Co., Inc. . 157
Wheland Co., The 92
Whister Equipment Co. 191
*Whiting Corporation 64
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp. 52 & 53
Wilcox Forging Corp. 193

Y

*Yale & Towne Manufacturing Co., The 164
*Yoder Co., The 47
Youngstown Sheet & Tube Co., The 67

CLASSIFIED SECTION

Clearing House 188-191
Contract Manufacturing 192-193
Employment Exchange 192
Equipment & Materials Wanted 192



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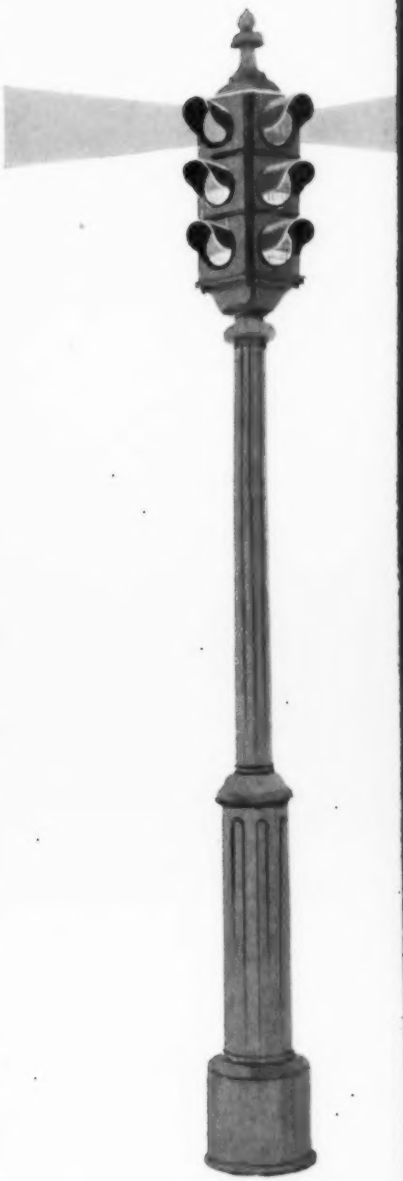

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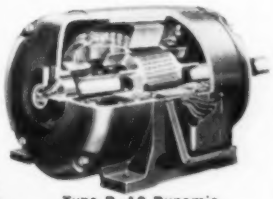

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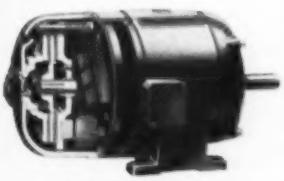

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